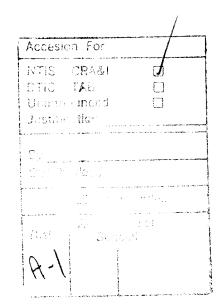
Rocky Mountain Arsenal Information Center Commerce City, Colorado



# 60% Design Cost Estimate Interim Action Rocky Mountain Arsenal Basin F



U.S. Army Corps of Engineers
Omaha District
Omaha Nebraska

August, 1987

# **Woodward-Clyde Consultants**



In Association with HDR Infrastructure, Inc.
Consulting Engineers, Geologists and Environmental Scientists
Stanford Place 3, Suite 1000
4582 South Ulster Street Parkway
Denver, Colorado 80237
(303) 694-2770

## REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Collection of Information, Including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information, Operations and Reports, 1215 Jefferson Collection of Information, Including suggestions for reducing this burden, and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

AGENCY USE ONLY (Leave blank)  2. REPORT DATE  08/00/87  3. REPORT	TYPE AND DATES COVERED
TITLE AND SUBTITLE ESTIMATE INTERIM ACTION, ROCKY MOUNTAIN ARSENAL, BAS	5. FUNDING NUMBERS
AUTHOR(S)	
PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
WOODWARD-CLYDE CONSULTANTS OMAHA, NE	87289R01
SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSORING/MONITORING AGENCY REPORT NUMBER
ARMY CORPS OF ENGINEERS. OMAHA DISTRICT DENVER, CO	·
1. SUPPLEMENTARY NOTES	
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLI	MITED
3. ABSTRACT (Maximum 200 words)	
COST ESTIMATES FOR THE FOLLOWING: 1. RIP-RAP REMOVAL 2. GRADING	
3. CLAY FOR CAPPING AND LINING 4. WASTE PILE SELECT FILL 5. TOPSOIL 6. SUMPS AND PIPING	
7. DEBRIS REMOVAL 8. HAULING WASTE 9. SOLIDIFICATION	
10. ROADS 11. FILTER 12. DRAINAGE NET.	
	•
14. SUBJECT TERMS	15. NUMBER OF PAGES
LINERS, SOLIDIFICATION, TRANSPORT, COST	16. PRICE CODE
	l ·

STAGE ONE CONSTRUCTION			
REMOVE RIP RAP (SO. END)	6,250 C.Y.	\$5.50	\$34,375.00
REGRADE SOUTH BERM	32,250 C.Y.		\$85,785.00
HAUL SLUDGE TO STOCKPILE	91,370 C.Y.		\$243,044.20
CLAY CAP ( 2 FT. )	48,070 C.Y.		\$330,240.90
		SUBTOTAL	\$693,445.10
			3073,445.10
LANDFILL CONSTRUCTION			
EXTERIOR BERMS	20,200 C.Y.	\$7.34	\$148,268.00
CLAY LINER-BOTTOM ( 2 FT. )	43,300 C.Y.	\$7.34	\$317,822.00
CLAY LINER-TOPESIDES (2 FT.)	51,970 C.Y.		\$560,236.60
INTERNAL GRADING	48,600 C.Y.	\$2.66	\$129,276.00
SELECT FILL ( 2 FT. )	56,760 C.Y.	\$7.59	\$430,808.40
10P°SOIL ( 6 IN. )	13,000 C.Y.	\$2.93	\$38,090.00
DRAINAGE NET( 3 LAYERS )	1,986,410 S.F.	\$0.35	\$695,243.50
SYNTHETIC LINER(2 LAYERS)	1,307,160 S.F.	*0.80	\$1,045,728.00
GEOTEXTILE FABRICS(3 LAYERS)	1,986,410 S.F.	\$0.25	\$496,602.50
SUMPS AND PIPING a	1 L.S.	\$36,120.00	\$36,120.00
		SUBTOTAL	\$3,898,195.00
MODIU I SCOON V.B. C. M. CALLS			
HORTH LAGOOM '(8.5 M GAL) EXCAVATION	F1 000 0 11	••	
CLAY LINER ( 2 FT. )	54,000 C.Y.		\$143,640.00
SYNTHETIC LINER(2 LAYERS)	11,000 C.Y.		\$80,740.00
DRAINAGE NET(1 LAYER)	296,600 S.F.		\$237,280.00
SMITH ELICI ERICKY	148,300 S.F.		\$51,905.00
		SUBTOTAL	\$513,565.00
LEACHATE LAGOON (1.5 M GAL)			
EXCAVATION	10,000 C.Y.	\$2.66	\$26,600.00
CLAY LINER ( 2 FT. )	3,750 C.Y.		\$27,525.00
SYNTHETIC LINER(2 LAYERS)	101,250 S.F.	\$0.80	\$81,000.00
DRAINAGE NET(1 LAYER)	50,625 S.F.	\$0.35	\$17,718.75
	•	SUBTOTAL	\$152,843.75
		<b>₹</b>	•
LIQUID REMOVAL			
PUMPS AND APPURTENANCES	i L.s.	\$63,192.00	\$63,192.00
FORCE MAYN	1 L.S.	\$298,617.00	\$298,617.00
ELECTRICAL	1 L.S.	\$18,514.00	\$18,514.00
0 & M	600 HRS	\$13.76	\$8,256.00
4	•	SUBTOTAL	\$388,579.00
CONTANINATED MATERIAL REMOVAL	-		
REMOVE RIP RAP	18,750 C.Y.	<b>\$</b> 5.50	\$107 13E 00
REHOVE SEVER AND MISC.	15,000 C.Y.	\$4.88	\$103,125.00
MAUL WASTE TO SOLIDIFICATION	337,540 C.Y.	\$4.08	\$73,200.00 \$1,377,163.20
NAUL TO WASTE PILE	337,540 C.Y.	\$4.32	\$1,458,172.80
	20. 12.40 801.	SUBTOTAL.	\$3,011,661.00
			<i>,</i> ,,,,,,,,,
SOLIDIFICATION	•		
FACILITIES CONSTRUCTION	1 L.S.	\$442,344.00	\$442,344.00
EQUIPMENT	1 L.S.	\$730,572.00	\$730,572.00
ELECTRICAL	1 L.S.	\$178,752.00	\$178,752.00
ELECTRICAL POWER	1 L.S.	\$71,400.00	\$71,400.00
FLY ASH	40,000 C.Y.	\$28.70	\$1,148,000.00

0 & H	4 4 0	#4 407 F// 00	** ***	
ADDITIONAL CHEMICALS		\$1,197,566.00	\$1,197,566.00	
WASSISHUF GUEUSPACS	1 L.S.	•	<b>\$4,670.</b> 00	
		SUBTOTAL	<b>\$3,773,30</b> 4.00	
SITE IMPROVEMENTS			•	
ROADWAYS (25 FT.) LEVEL B	4,167 C.Y.	\$11.33	\$47,212.11	
ROADWAYS (25 FT.) LEVEL D	2,315 C.Y.		\$22,895.35	
SIGNING	1 L.S.	\$10,000.00	\$10,000.00	
FENCING ( 6' W/ 3 BARBS )	6,000 L.F.	\$12.00	\$72,000.00	
	••••	SUBTOTAL	\$152,107.46	
			·	~
RUNOFF/DUST CONTROL			•	
PUMPING	1 L.S.	\$50,000.00	\$50,000.00	
DIKES	25,000 L.F.	\$1.00	\$25,000.00	
DUST CONTROL	1 L.S.	\$50,000.00	<b>\$50,000</b> .00	
		SUBTOTAL	\$125,000.00	
AFACRATE (B) COROLLI AGORDO MARIO				
LEACHATE/BLOWDOWN LIQUID HANDLING				
TRANSPORT TO LAGOONS	1,500,000 GAL.	° \$0.10	<b>\$150,00</b> 0.00	
_		SUBTOTAL	<b>\$150,00</b> 0.00	
EQUIPMENT DECONTAMINATION				
SOLIDIFICATION FACILITY	1 L.S.	\$25,000.00	<b>635 000</b> 00	
LAGOONS	2 EA.	\$10,000.00	\$25,000.00	
PUMP STATION AND FORCE MAIN	1 L.S.	\$7,500.00	\$20,000.00	
DECON AREA & MISC.	1 L.S.	\$7,500.00	<b>\$7,500.</b> 00 <b>\$7,500.</b> 00	
		SUBTOTAL	\$60,000.00	
			<b>300,000.</b> 00	
BASIN CAPPING/TOPSOILING				
GRADE AND SHAPE	224,500 C.Y.	\$2.66	\$597,170.00	
CLAY CAP ( 2 FT. )	215,160 C.Y	\$6.87	\$1,478,149.20	
TOP SOIL ( 6 IN. )	73,880 C.Y.	\$2.93	\$216,468.40	
SEEDING	510,000 S.Y.	\$0.15	\$76, <b>500</b> .00	
		SUBTOTAL	\$2,368,287.60	
		TOTAL	<b>\$15,286,987.91</b>	
	10%	CONTINGENCY	\$1,528,698.79	
		MOBILIZATION	\$764,349.40	
	4%	COST GTH MOPT	\$611,479.52	
	7%	SUPERVISION	\$1,070,089.15	
	12%	0 & P	\$1,834,438.55	
a, °		==	**********	
		GRAND TOTAL	\$21,096,043.32	

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Subject <u>Basy</u>	F 60% COST ESTIMATE	_ Project No. <u>86 C8554 P</u>
By D. HAWK	Checked By Ton Killy	Task No&
1 D. MACK		File No. <u>21947</u>
ate 7/7/87	Date 7/13/87	Sheet of _ 2
5772-	ONE CONSTRUCTION	
	- MOVE MATERIAL ON SOUTH E	END OF BASIN AND
	PLACE CLAY CAP TO ALLO	OW CONSTRUCTION OF
	WASTE PRE AND SOLIDIFIC	4770N FACILITY.
	Parada Pla Para Sa	Fig.
	. Remove RIP RAP So.	
	QUANTITY = 1/4	(25,000 CY) = 6250 CY
******	UNIT PRICE = #5 (See Cost 17	50/c4 /
	(See Cost 17	em 1)
	į į	
	LOST = 6250 CY	x 55 /cy = #34,375
-	· Regrade South Ber	$\sim$
	QUANTITY = 14 (	129,000 CY) = 32,250 CY
	(129,000  CY = 76	THE BASIN F BERM QUANTIL
	UNIT PRICE = "Z (SEE COST 1	
	CSEE COST 17	rem E
	Cost = 32,250	CY x 266/c4 = 485,785
	· Haul Sludge to	Stockpile
	QUANTITY = 91,	370 69.
	UNIT PRICE = "	266 /241
+	Cost = 91,370 c	y x 2 6 /cy = 9243, 044
	(See Cost H.	y x 2 4 /cy = 4243, 044 20
	· Place Clay Cap for	Basin
	QUANTITY = 191,=	370-43,300 = 48,070 CY
		WA - AREA OF LANDFILL
	USIN4 2 FT .774	
	118	7/211 / S. C. Lyn. 250

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ate	7/2	7/87		Date	7/13	187	0				of	
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		1										
<u> </u>	+	•	Pla	ce.	Clay	Cap	o for	Basi	in F	Con	tinued)	)
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				70	774 4	=		ley!				
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D. HA	PAIK	Checked By	Tom Kell	leg	Task No	2	
- 1104			/		File No	2194	<u> </u>
ate $7/7/8$	37	Date 7/13	167		Sheet	of	3
•							
	LANDFILL	CONSTRU	CTION			:	
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		EXTERIOR	BERM	CONSTRU	1C710~		
		QUANT	17y =	20,200	cy!		
			1 .	4734		Cos- 1-	24
			ļ	. 1		COST 17E	~/3 J ;
		· · · · · · · · · · · · · · · · · · ·	ITEM ?	3 = #44	-/04		
	and the second of the second o		*	1			
		1	•	= 4734	•	-	
		Cost	= 20.	200 64	× #7 34/	24 = 148,	268
		CLAY L.	WER - E	BOTTOM	:		
	1					-	· Aur
	!	QUAN		Į.	· ·	•	
		UNITI	PRICE =	7734/	cy (sec	COST /TE	75 3,53
			/2m 3	2 142	101		
			ITEM S	222	104		
			7	= #735	1/14	<del> • • • •-</del>	
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		COST	= 43,3	20cyx 7	-/ / 64	317,8	ZZ -
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	•	CLAY LI	WER -	13P AND	JIDES_		<del>-</del> -
		QUANT	174 =	51,970	CY		<del></del>
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		Cost=	51,970	0 CY = 1	1078/cy=	= 560,2	36 50
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•	D. HAWK	Checked By	Project No. <u>86 C8554P</u> Task No. <u>2</u> File No. <u>31947</u>
Date	7/7/87	Date 7/13/87	Sheet of 3
:		DANTITY = 48,600	Cy (See Cost Itom 2)
		Cost = 48,600 x	266/cy = \$129,276°
		PLACE SELECT FILL (SO	
		QUANTITY = 56,76	y (See COST ITEMS 798)
		Tem 7 = #1  Tem 8 = #5	81/cy/ -20/c4/
		TOTAL = #7	15 /cy 18759/cy = 4/30, 80840)
		DIANTITY = 13, and	CY.
		UNIT PRICE = 2 13/0	y (See Cost Hem 9) x#2½/cy = \$38,090€
		DRAWAGE NET	
			ISF (See Cost ITEM 10)
		Cost = 1,986,410 S	F x \$ 035 = 695,24350

Subj	ect <u>BASIN F</u> C	0% COST ESTIMATE	_ Project No. <u>86 C855</u>
v	D. HAWK	Checked By Torr Kelley	Task No.
			File No
ate	7/8/37	Date 7/1/87	Sheet <u>3</u> of <u>3</u>
		SYNTHETIC LINER	•
<u></u>		QUANTITY = 1,307,160	) 55
<u> </u>			
			F (See Cost I tem 10)
-		COST = 1,307,160 SF	× 4030/SF = 41,045,728
	<u></u>	GEOTEXTILE FABRIC	,
_		QUANTITY = 1,986,41	/
		UNIT PRICE = #025/	SF(see cost Item 10)
		COST = 1.986 405	F x 0 25/F = 496,602
_			
	•	SUMPS AND PIPING	
			ma /c. Cod Ham II)
-		LUMP SUM = Sp, 1	120 (See Cost I tem 11)
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Subjec	t <u> </u>	SIN F		et Estim		Project No	86C85541
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ate	7/3/	87	Date 7/	12/87		Sheet	/ of2
·							
		MORTH	LAGOON	CONSTIL	200770N		•
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			· Exca	WA 7702			
					- 5400		•
				UANTITY =	1		
<del>-</del>	<del></del>	1	Un	IT PRICE	= #26	L/cy (see	Cost Item 2
			1	1	ļ		
		· · · · · · ·	Co	ST = 3	54,000 C	y x 2 = /c	y= 443,640
-					-		
-			· ( , A4	LINER (	(Z FT.)		
						•	
			Q	ANTIM =	2' × 148,	300 SF = 27	CF = 10,985
							C <sub>7</sub>
					- ; · <del>  </del>	7	SAY 11,000 C
			1)4	VIT POICE	= #734	CY (See C	ost Items 3 ? 5
	!				í		
				170	m 3 =	# 4 42/c	1
		ļ		175	m 5_=	*2 -/cy	
<del></del>	<u> </u>				7,-701 =	# 734 /c	<del></del>
				<b>.</b>		į	
<del></del>			Co	57 = //	000 CY X	9734/c4	= 80,740
			<del></del>				
			· JYNT	HETTE LI	NER CC	LAYERS)	
				DONTITU	= 2 × /	148,300 SI	= = 296 600 S
			$\cup$ $\cup$	WIT PERE	= 108	/SF (SAE	Cost Hem 10
				4,4		# 807	\$ 222 20-
			Ca	>= 29	16,600 SF	X O /SF	= 237,280
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ate	7	1/8/	37		Date	7/13,	/87		•		She	et <u>2</u>	<u> </u>	. of	2
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Subject <u>BASIN F 60% COST ESTIMATE</u> Project No. <u>86 C8554P</u>

By D. Hawk Checked By Tom Kelley

Date 7/9/87 Date 7/13/87 Sheet 1 of 1

#### LEACHATE LAGOON CONSTRUCTION

· EXCAVATION

· CLAY LINER

· SYNTHETIC LINER (2 LAYERS)

· DRAINAGE NOT (1 LAYER)

	•	
By D. HAWK	Checked By Ton Kelly	Project No. <u>86 C8554P</u> Task No. <u>31947</u> File No. <u>31947</u>
Date 7/9/87	Date 7 / 13/67	Sheet of
LIQUID	Romovae System (Se	e Cost Item 12)
	· Pumps AND APPURTENAN	りとき
	WATER CONCRETE SLABS GUARORAILS AIR SUPPLY SYSTEM FUMPS	4393 = / 4393 = / 1645 = / 19,822 = / 27,668 = /
		- \$63,192°
	· FORCE MAIN	,
	LABOR MATERIAL Equipment	148,857 148,748 1012
	TOTA	L 298,617 €/
	· ELECTRICAL	
	BEANCH TO COMPRESSOR LIGHTING TO COMPRESSOR	•
	T	BYAL 1851400
	· 0 7 M 600 HRS * 41376/	hr = #825600

 Subject BASIN F 60% Cost Estimate
 Project No. 86 C8554P

 By D. HAWK Checked By TCK
 Task No. 2

 Date 7/9/87 Date 7/13/87
 Sheet \_\_\_\_/\_\_ of 2

#### CONTAMINATED MATERIAL REMOVAL

- · REMOVE RIP RAP

  QUANTITY = 25,000 CY \* 3/4 = 18,750 EY

  UNIT PRICE = \$550/CY (See Cost Hem 1) /

  Cost = 18,750 CY \* \$550/CY = \$103,12500
- · REMOVE SOURZ AND MISCELLANEOUS DEBEIS

  O.K.

  QUANTITY = 12,000 CY × 1.25 = 15,000 CY

  (12,000 CY FROM CLOSURE RAN, BASIN F

  ROLKY MOUNTAIN ARSENAL, EBASCO,

  DECEMBER, 1985 WITH 25% CONTINGENCY)

  UNIT PRICE = 4 88/CY (See Cost Hems 13; N)

  Cost Hem 13 = 4 08/CY

  Cost Hem 14 = 08/CY

  TOTAL = 4 88/CY = 473,200°,
- HAUL WASTE TO SOLIDIFICATION

  QUANTITY = 362,540 CY 25,0∞ CY
  = 337,540 CY ' RIP-RAP

  UNIT PRICE = 408/CY (See Cost Hem 13)

  Cost = 337,540 CY × 41/08/CY
  = 41,377,163 ≥ 0

Subject BASIN F	- 60% COST ESTIMATE	Project No. <u>86 C8554P</u>
By D. HAWK	Checked By Tom kelle	Task No. 2
		File No. <u>21947</u>
Date 7/10/87	Date 7/13/87	Sheet <u>2</u> of <u>2</u>

· HAUL WASTE TO WASTE PILE QUANTIFY = 337,540 CYV Unit PRICE = 4 32 (See Cost Hems 14 : 15) Item 14 = 00 00/c4 V Item 15 = 43 5 /cy V TOTAL = \$432/cy Cost = 337,540 cy x 4 32/cy=41,458,172 80

Subject BasiN F 60% Cost		Project No. <u>86C2554P</u>
By D. Howk Checked By	L C VVA	Task No.
	<u> </u>	File No
Date 7/10/87 Date 7/13	167	Sheet of
		programmed in a silk and a silk a
	·	4
SOLIDIFICATION (	See Cost Item	16)
· FACILITIE	S CONSTRUCTION	$\omega$
		9595 <u>*</u>
1	WALL # 1	9511 = 1
	TE SLAB 41	7,5 · / / / / / / / / / / / / / / / / / /
	•	
	TOTAL 4	42,344=
· Equipm	en)T	
~~~~	5 <b>~</b> /	
	SH TANKS	# 485,698 °C
1	PILLS	485,698
	CONTROL SYSTEM MA SCRUBBER SYSTE	# 22,560°/ m # 94,314°
HIMMON		-
	TOTAL	- 730,572° H
· ELECTRIC	r Ar .	#178,752 #
	•	•
· ELECTRIC	an Power	\$ 71,400° +
· Fly Ash	1	#1,148,00000 +V
	,	1,170,000
· 0; M		
M. a.		459,70200
Man P Equit		738, 36400
7011		
	TOTAL	A 1,197,566 00 *
· ADDITIONA	· Culmara is as s	
	-	
H <sub>z</sub> SC	24	3800 <del>-</del>
Na C	10	360°
Na O	Ħ	<u>5/0°</u>
	TOTAL	467000 *
	•	

Subject BASIN F 60% COST ESTIMATE Project No. 86 C8554F Task No.\_\_\_\_ Checked By Ton Kell By D. HAWK Date 7/10/87 Sheet \_\_\_\_\_ of\_\_\_ 7/13/27 Date SITE IMPROVE MENTS · ROADWAYS (LEVEL B) QUANTITY = 9000 FT x 25FT x 0.5FT ÷ 27CF = 4167 cy UNIT PRICE = 11 32 /cy (See Cost I tem 19) Cost - 4167 x 113/ey = 47,2124/ · ROMDWAYS (LEVEL D) QUANTITY = 5000 FT × 25 FT × 0.5 FT + 27 CF = 2315 cy/ UNIT PRICE = #9 89 /cy (See Cost Hem 18) Cost = 2315 01 x 989/ey = \$22,895 35/ · SIGNING QUANTITY = 50 signs (estimated) UNIT PRICE = 200/SILN (estimated) 3 h. Cost = 50 x 200/sign = \$10,000 00 V · FENCING QUANTITY = 6000 LF (estimated) o.k. UNIT PRICE = "12 =/LF (1987 METRUS 2.7-090-0600 6' high aluminized steel w/3 banks = 1151/c= Cost = 6000 LF x 1200/LF = 472,0000

Subject BASIN F 60% COST ESTIMATE Project No. 86CB 554P Task No.\_\_\_\_ By D. HAWK Checked By T. Kill File No. Date 7/10/87 7/17/87 Sheet \_\_\_\_\_ of \_\_\_\_ Date RUNOFF DUST CONTROL · PUMPING QUANTITY = 5,000,000 gallons (estimated) Unit Price = #00/gallon From MEANS 1987 2.3-100-0800 8 hrs attended 2" diaphragm pump Say averages 50 gpm & 8 hrs/day 50 gal/min × 60 min × 8 hr = 24,000 gal PRICE = 2630/DMY UNIT PRICE = 263 = 6A4 - 24,000 gol/day
= #00 /6AL O.A. Cost = 5,000,000 gal. x 0 0/gal = 50,000 / · DIKES QUANTITY = 25,000 LF (ESTMATED) O.K. UNIT PRICE = 4/00/LF (ESTIMATED) O.K. Cost = 25,000 H x 100/15 = 25,000 = - DUST CONTROL COST = 30,0000 (ESTIMATED) C.A.

Ву	D. Howk	Checked	By Tom Killy	Task No
Date	7/10/87	Date	7/13/67	Sheet of
	LEACHAT	e /Bu	א פנוקט א אנטפעט	HANDLING
		· TRA	INSPORT TO LAGOO	NS
			QUANTITY = 1,50 (Volum	00,000 gallons o.k.

UNIT PRICE = 0 10/gallon.

(Use 4,000,000 gal = 388,579 00 /gallo. Cost = 1,500,000 gal x 0 10/gal = 4,50,000

Subject BASIN F	60% COST ESTIMATE	Project No. 86 C8554P
By D. HAWK		Task No. 2
		File No. 2/947
Date 7/10/87	Date 7/13/97	Sheet of

EquiPMENT DECONTAMINATION

Subject BASIN F 60% COST ESTIMATE Project No. 86C8554P Checked By Tom Kelle Task No.\_\_\_\_ By D. HAWK File No. <u>21947</u> 7/13/87 Date 7/10/87 Sheet \_\_\_\_\_ of Date

# BASIN CAPPING /TOPSOILING

· GEADE AND SHAPE

· CLAY CAP (ZFT)

Cost = 215,160 Cy x 63/ey = 1,478,149 29 -

· TOPSOL

Subject BASIN F  By D. Hawk  Date 7/10/87	Checked By Ton-Kell	Project No. 86 C8554P  Task No. 2  File No. 2/947  Sheet 2 of 2
	* SEEDING  QUANTITY = 5/0,00  (105 Acre)	00 54. × 43,560 ÷ 9 = 508,200 sy) = /sy o.k. =/acre ÷ 43,520 × 9= 40=/sy)
		ACRE +43520×9= 6=/64)  × 0-5/54=476,500=



Project RMA-Rain F-WWC Computed Computed Subject 2 - 11 tius - 1 | Date 3/17/87 | Shr. | Of

1) Exercate For Wastepile & SolidiFication Anca 810x850 = 688,500 5.F. x2.5+/27 = 51,000 C.Y. 150x 300 = 45,000 S.F. x 25x/22 = 3,333 C.Y. = 500' 500'x 1,000 x 2/27 91,370 C.Y.

2) mostepile Bern 2(755+805)=3,126 4.F. 5x20+5x15.1755.F.

544 20, 200 CY (3,120)(175)/27= 20,222 C.X slipe yardage

3) Clay Blacket Por Wastepile & HOX790 4' (110%) /27 = 95,7

BOTTOM = 140 × 790 × 2 FT/27 = 43,300 cy

TOP \$51065 = 95,270 cy = 43,300 = 51,970 cy 95, 268 C.Y. SAY 95,2

[95 A. (43,560) - 1740x790] 2/27= 300,538

5) Topsoil Son Woostepile (740x790) 0.5' (120%)/27= 12,991 C.Y. SAY 13000 (

(e) Topsoil For Basic 'F' Proper [105A. LA3, 5LO] - L740x720) ]0.5 /27= 73,874 C.Y.

7) Exervate For Brain F' L'Entire Site juel. mastepile) 342,542 C.Y.

8) Grading For Basin F' C-3256,744C.Y. 544 256,750 cy E- 5-11, 5-08 - 50, 555 - 5-25, 480 C. X. **ال** 1

7) Internal Conding (WASTE PILE) (700'x750 x 5/2) 27 - 48,44 C.Y. SAY 48,600 CY

10) Select F: [1 (WASTE PILE) (SIO × 800 × 2/27) 110% = 54,740 C.Y

11) Stage One Bern Removal YA Bern V.I. (129,000) = 32,250 cy

ad 42

85, 600 C.Y.

- 315, 500 C.Y. 11:7

Cut (:wel. Born) = 154,000 C.Y.



Subject Fluid Quantities Date /5/87 Sht. Of 1

# Morth Pul

Area = 870, cell = F.

Are. Depthe D.33 24. ( back on into in 230c+86

letter of Holme Robert i Owen

Vol. = (870, cell (0.33) (7.401) = 2, 149, 303 gel.

#### Southwest Pool

Aren 114,510-193= 114,317 3.F.

Are. Deptho 0.23 54. ( booch on 23 Oct 84 letter

Vol. = 114,317 (0.23) (7.481) = 200,139 god.

### Southern Pool

Area-139,741 3.F. Are. Depth- 0.45 Et. (bourd on 23 Oct 86 letter) Val. = 139,741 (0.43)(7.481) = 470,431 gal.

#### 2 S.E. P...

Area = 7,451+5,814 = 13,245 = F.

Ave. Deptur D.1 St. Cassumed)

Vol. = 13,245(D.D) (7.481) = 9,923 gal.

Total Vol. = 2,829,794 gal. -> 5 10/25/84

Subject LINER QUANTITY Project No. 86CASS47 Task No. By D. Howk Checked By RWG File No. \_\_\_\_\_2/947 Date 3/21/87 Sheet \_\_\_\_ / \_\_ of\_\_\_ Date LANDFILL 500 × 550 = 275,000 SF × 102 × 280,52 TOP AREA 143.7' × 2720LF = 390,930 SF x 1.02 = 398,75. 810 × 1860 = 615,600 SF × 1.02 = 627,90 SIDE AREA BOTTOM AREA 1,307,1605 DRANKE NETS = 7627,9/0 = 1 = Z × 280,500 = 2 = Z × 398,750 = 1 BOTTOM 627,910 Z VBPS 561,000 2 5,065 797,500 1,986,40: SYNTHETIC LINERS 1. BOTTOM
1. SIDE | See above 1,307,160 SF GESTERTILE NETS 1 BOTTOM } 2 TOPS } SEE DRAINAGE NETS 1,986,410 2 SIDS

_				e <i>No.e.</i> 7 hecked By				Project No Task No		_	
/ 1	D. How		C	пескео ву	, , , , , ,	Ù		File No	೨	194	7_
ate	7/8/8	7	D	ate 7	11:187	<b>-</b>		Sheet			
<u>.</u>			-								
							· · · · · · · · · · · · · · · · · · ·		1	i	
	<u> </u>	NORTH	LAG	OOM . Q	UANTI	MY FO	R EXC	AVAIA			
	<del></del>			m. Des	- (1)	> ====	IC LANG	60%		<del></del>	
	<u> </u>									1	*
			<u> </u>	310	10	BOTTO	n		12'	deer	>
				382	0	TOP					
					: ;						
			Voi	UME							
					2	27	. , .			<u>_</u>	7/2
				310	<u> + 38</u>	<u> </u>	x /2 ÷	27 <u>CF</u>	=	53, 7	23
		· -									
				<del></del>	7 4 30	-1->1	2/27	= 5-3	207		
			· - <del>-</del> -	KAU			pu		,	<i>-y</i>	
				47	5 9	,000	CY C	D.K.			
		<u> </u>					******	. :			
-											
			1					:			
				EA	<u> </u>	-					
	-			R	n len	TH =	2 × 117	2+362	7 + 3	10 =	385
•			-	1	i						
				ARE	= (3	35')		148,225	5_5F		
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•							SAY	148,3	00 5	F 0.	k·
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			1,2,	- <u>-</u> -	1 + +			++-,			
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			1-1-4-								
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V	$\mathcal{D}_{\cdot}$	H	puk		Check	ked By	TI	alle		Task No.		<u> </u>
			_					//		File No	21	947
ate	7/	9/	87		Date	7/	13/87	ı. <i>O</i>		Sheet		_ of/_
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-		-	10	ACHATE	ها	المام	1/1/	millip	n gal	Ims)	 : •	<u>;</u>
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				<u>(a)</u>	Hr	· e.u.	0+	Liner	( Us	e 225	WIP	ermsj
				· · · · · · · · · · · · · · · · · · ·		27	25' ×	225	= 5	0,625	SF /	
						<b>T</b>						:
			<u> </u>	<b>b</b> )	Vo	ume	of	exca	ustion	لـ د		
			-			/	<u> </u>	72	(130		40 =-	. 27
						(20	0 F	-) <sup>2</sup> +	(120	FT)2×	10 F	r ÷ 27 c
									1	FT) 2 +120,] 2	1727	r ÷ 27 <u>c</u>
									1	7	1727	r ÷ 27 c
						=	10,0	74	34	2 x		r ÷ 27 g
						=	10,0	74	34	7		r ÷ 27 s
				:		=	10,0	74	34	2 x		r÷27 s
						=	10,0	74	34	2 x		r ÷ 27 g
						=	10,0	74	34	2 x		r ÷ 27 s
						=	10,0	74	34	2 x		r ÷ 27 g
						=	10,0	74	34	2 x		÷ 27 s
						=	10,0	74	34	2 x		÷ 27.6
						=	10,0	74	34	2 x		r ÷ 27 g
						=	10,0	74	34	2 x		r ÷ 27 g
						=	10,0	74	34	2 x		r ÷ 27 g
						=	10,0	74	34	2 x		r ÷ 27 s
						=	10,0	74	34	2 x		r ÷ 27.5
						=	10,0	74	34	2 x		r ÷ 27 s
						=	10,0	74	34	2 x		r ÷ 27.5
						=	10,0	74	34	2 x		r ÷ 27 s



Project Computed Subject Sht. Of

5) Area of Execution Balon E1. 5188 ( Clay Cap would be part of F:11) = 60 A.

Vol. . LO x 43,540 x2/27= 190,000 C.Y.

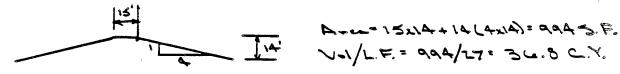
(2) Cover (5:4e MA). For Toposil)

Ancer 11:0 A.

Assume 194. Leptur

Vol= 110 (43,560)(1)/27 = 177,500 C.Y.

7) Montepile Bern Qty 20' hr. pile (25'moste + 3' cover) >> 12 A. square Bern Lengare 723' + 7' = 730'



V.1. = 34.8 (4x730) = 107,500 C.Y.

8) Q1, Wante Circl Rig-Reg) 393,300 C.X.

9) Cly C-8 93.5 A. - 3.5A. - 12. A. + 78 A. 78 x 2 x 43,540/27 = 251,500 C.Y.

	•		
	Project	Computed	CLE by EUR
j	Subject	Date 1/27/87	Shr. Of
	1) Rip Rap Day	, ,	
		4" + which we	, .
	5200		Moral Section
	5	5190	Ben \$ 200' E. D.
	11.5" x (187.71/1) x Z'x 51' x (16/2)=	B,155 C.Y.	
	5105		Busin F-1
	19" x (187.711/1-) x 2' x 25.5' (1/27) = C.	735 C.Y.	
	7" x (187.71)/1" > x2'x 95' (1/27) = 9,24	+5 C. Y.	East Side
	Approx. Rip Rop Dy= 24,13= SAY 25,00		ard on <u>24"</u> which
	2) Bern Qty		
	From CABB Vol. = 85,0	.00 C.Y.	
	3) F:11 Q 4		

F... CABB Vol. = 315, 500 C.Y.

A) Cut Linel Beam)

F--- CABE Vol. - 154,000 C.Y.

Rip Rap Removal Operation

Subject CANTAMINATED RP RAY REMOVAL	Project No. 86C8554P
	Tesk No
By D. Howe Checked By T.	File No. 21947
Date 1/23/87 Date 1/16/57	Sheet of
RIP RAP REMOVAL UNIT RATES	Dan 0
1) DOZER 300 HP	DAILY RATE #898 00
· ·	-3
2) FRONT END LOADER 225 CH	
3) 2 Equip OPERTOR C.	
Assume 7-1290 LONGS/MC = 100 Cy CBMC = 800 CY	•
Come = 800 cy	
4) 3 1240 END DIMPS	
5) 3 TRUCK OPERATORS	
s) 3 True preemus	
	2903 000
#2000 / =	4060 /au
\$2900 /800 cy =	#3 6 /cy
	mu
W/ SAFETY @ 50% =	4/8/01
TOTAL	\$540/c4 544 550
en e	

	EW AND PRODUCT				DATE PREPAR	
PROJECT RMA	5 to , sac 1 m 5 500 2	. the propon	ent spency is USA	PREPARED BY		CREW REF NO
LOCATION	Co	•		Tom Kel		
		CREW	COMPOSITION		0	
WORK TYPE  EXCHATION / HANNING	WORK SCHEDULE			SPECIAL INFORM		
			LAI	IOR COST	EQUIPM	ENT COST
CREW DESCRI	PTION .	NO. REQUIRED IN CREW	HOURLY* RATE (\$/HR)	TOTAL FOR CREW (8/HR)	HOURLY RATE (\$/HR)	TOTAL FOR CREW (\$/MR)
CAT DOL T	DOZER	1.	16 88	1688	106 37	10637
CAT 966 D	LOADER	1	16 88	16 88	61.10	616
12 CY END Dum	P TANDEM AXIE	3	1678	50 34	37 50	111 90
			۰			
			•			
					·	
and the same of th			•			
·						
TOTALS	MANHOURS	5	LABOR	8410	EQUIPMENT	279 37
			COST RODUCTIVITY	07	COST	2/7
	PRODUCTIVITY I		ABOR		1	
WORK TASK	RATE	MH/UNIT	8/UNIT	EQUIPMENT S/UNIT	СОММ	ENTS
EXEMPTION / HAVE INC	98 cy/HR		10 86/ey	4285/ey		•
SAFETY				1 95/cy		
						<u> </u>
TOTAL EQUIMENT, LABOR & SAFETY				->	4566 USE 455	ley -
	·				USE \$55	ley asok
	•				IN PREL.E	STIMMTE
* Including fringe benefits						-
DA FORM 5419-R, Apr 85						

2

**C** 

	REW AND PRODUCT			ACE.	5/2/87	7
PROJECT		<u> </u>		D. HAWK		CREW REF NO
RMA LOCATION DENVER,	Co	•		CHECKED BY T. Kol		
		CREWI	COMPOSITION	. (	7	<del></del>
WORK TYPE SAFETY	WORK SCHEDULE			SPECIAL INFORMA HAUL TO STOC	TION RIP RAF	REMOVAL
	_1	T	LAI	BOR COST		ENT COST
CREW DESCR	IPTION .	NO. REQUIRED IN CREW	HOURLY* RATE (8/HR)	TOTAL FOR CREW (8/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)
HEAVY EQUA	MENT	5			38 20	19/00
			•			
			•			
·						
	<u> </u>					
		1				
		<del>                                     </del>				
		<del>                                     </del>				
	<del></del>	1				
TOTALS	MANHOURS		LABOR		EQUIPMENT COST	1.91 00
		·	IODUCTIVITY			
work task	PRODUCTIVITY RATE	MH/UNIT	S/UNIT	BOUIPMENT	СОММ	ENTS
SAFETY	98 CY/HR	MR/UN.	3/UN1:	8/UNIT 8/25/cy		•
			-	, , -,		
<del></del>					•	
	•					
		<del></del>		<u> </u>		

- Sludge Handling
  Stage 1 Stockpiling
  Regrade Berms
  Waste Pile Internal Grading
  North Lagoon Excavation
  Grade and Shape Basin F
  Leachate Lagoon Excavation
  Topsoil Grading

_	W AND PRODUCT			CE	3-18	EE - 87
PROJECT RMA				D. HAWK		CREW REF NO
DENVER, C	0.	o		CHECKED BY T. Kelley		•
		CREW	COMPOSITION			
WORK TYPE EXCAVATION HAULING	WORK SCHEDULE			STAGE 1		
		NO.		OR COST		ENT COST
CREW DESCRIP	TION	REQUIRED IN CREW	HOURLY® RATE (S/HR)	TOTAL FOR CREW (\$/HR)	HOURLY RATE (\$/HR)	FOR CREW (\$/MR)
CAT 627 B	SCRAPERS	6	1703	102 18	117 22	706 62
CAT DEL DO	2645	4	1688	6752	10637	42548
CAT 14G MOTE	e grader	1	1703	1703	75 61	75 61
CAT D6 Do	er.	1.	1688	16 88	4640	46.40
MRS 1-1005 TRA	CTOR W/ DISC	1	1688	16 23	83 <sup>et</sup>	න <u>ු න</u>
LABORERS		2	12 TE	25 52		-
CAT 627 B Scan	APERS (STANDBY)	1			7537	7537
·						
	,					
·						
TOTALS	MANHOURS	15	LABOR COST	246°1	EQUIPMENT COST	141257
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	S/UNIT	EQUIPMENT 8/UNIT	СОММ	ENTS
EXCAVATION HAULING	870 cy/Hz		025/cv	#162/cy		•
Safety	870 CY/HR		018/cy	"0 51 /cy		
·						
TOTAL EQUIPMENT NITH LABOR & SAFETY					~ "2 b	cy
	•					
						•
* Including fringe benefits  DA FORM 5419-R, Apr 85						

CR	EW AND PRODUCT	IVITY WO	RKSHEET		DATE PREPAR	
	is form, see TM 5-800-2	?: the propon	ent opency is USA		1 3-18-	
RMA				PREPARED BY	,	CREW REF NO
LOCATION		····		D. HAWK		-
DENVER, C		•			y 3-18-27	1.
20.0.0	<u> </u>			, Kerie	7 3-18-87	<u> </u>
			COMPOSITION			
WORK TYPE EXCAVATION / HAULING	WORK SCHEDULE			STAGE I	STOCKPIL	Handring
		NO.	LAB	OR COST	EQUIPM	ENT COST
CREW DESCRI	PTION	REQUIRED IN CREW	HOURLY* RATE (S/HR)	TOTAL FOR CREW (8/HR)	MOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)
HEAVY EQUIPM	MENT	13	Carlotte Carlotte		3820	496 60
STANDBY HEAVY	Equipment	1			445	445
LABORERS		2	78°5	156 10		
		·	-			
	·					
				·		
· · · · · · · · · · · · · · · · · · ·	·					11.00 yes.
						and the second of the second o
	<del>, , , , , , , , , , , , , , , , , , , </del>					
·						
TOTALS	MANHOURS		LABOR COST	15610	EQUIPMENT COST	501°5
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	ABOR S/UNIT	EQUIPMENT S/UNIT	COMM	ENTS
· SAFETY	870 CY/HR		*0 18/cy	"0 58/cy		•
						•
					· · · · · · · · · · · · · · · · · · ·	
* Including fringe benefits  DA FORM 5419-R, Apr 85						

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Subject LANDFILL	כסאטראטנאסא - :	SLUDGE REMOVAL COST	•
By TEK	Checke	d By D. Haux	Task No. <u>2</u> File No. <u>2/94</u> 7
Date 3/13/87	Date	3/18/87	Sheet/of4
The wo material mutside - the bern dry. Dozers	from the the inner to where it	solidification area ferm to the sluc will be disced and used to excavate	ing and having excavated and the landfillarea, dge stockpik area inside d allowed to drain and material down to
used to the finis materia will as disc atta the mat	shed grade. al to the s sist in man achment with revial. A man	the material below The scrapers of ludge stockpile wing material and in the used for otor grader will	Radditional dozers will be must the liner down to will be used to have where a light object of a tractor with discincy and aeroting be used to maintalin a laborers will be used
and sludge zos, wherea with very lo	could have s other pa w rolling r	arts of the haul	ons of the excavation area ces as high as 15% to would be on how roads an average rolling houl.
<u>-</u>			

	<b>~</b>	Charles D.	D. HAWK	Task N	lo. 2
By 70	_K			File No	0. 21947
Date 3	3/13/87	Date 3/	18/87	Sheet.	Z of 4
Es	STIMATED CYCLE	TIMES	÷		
	HAUL PROFILE	(CAT 627	B SCRAPER		ottom of u to top of
			and the second s	STOCK	
			W/		
	and the second of the second o		• •		
					<b>+</b> /
			C	D	<u>E</u> 200'
	A	FB	2001	200 T GR = 2 %	GR 0 % RR ± 10 %
519/		200	GR=09.	RR= 109.	
	CFR=0%	GR= 290 PR=1090	RR= 10%.	<b>1</b>	•
	RR=1090	EK = IL			
! 	• <del>-</del>		LOADI	Fh U	HLOADED
	HAUL CYCLE	LENGTH	TRIT		TIME
					- <u>-</u> 6
	A A	200'	/01° C		% 0.22 9. 0.19
	<u>g</u> _	200'	12% 0		7. 0.17 7. 0.22
	D	200' 200'	129. 0		9. 0.19
	<u>.</u> 9	200'	109.0	7.21 /0	9.0.22
	· • • • • • • • • • • • • • • • • • • •		7-10		
•	TOTAL TIME		/.	63 /	1.04 /
•	@ 93% ALTITUD			,	=
ļ	PESA.		<u> </u>	75/	_ 1.12 /
ļ					
	T-AL ESTIA		- TIME		A Section of the sect
	TOTAL ESTIM	JATED CI CL	E . 1 / · · · ·		
1	H	40L		1.75 /	Service and the second service of the second second service of the
l		ETURH		1.12 /	
		OAD		0.8/	SELF LOAD OR
		ANUEVERA	SUMP_	0.8	Push LOAD
	e e e e e e e e e e e e e e e e e e e			i i a a mi	in , a 100% eff.
ļ		en e	enter i como compositorio dell'estato dell	4.47	in/cycle @ 100% eff.
	ه معمود این در در است. این این در این این است.	and the second s	•		
-		and the second s			
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	and the second s	4	and the second of the second of	my see a see a	

Subject LAND FILL CONSTRUCTION - SLUDGE REMOVAL COSTS Project No. 86 C 85 54 P

Subject LANDFICC-SLUDGE REMOVE	or costs	Project No. 86 C8554	1 <i>P</i>
By T. KELLEY Checked By	D. HAWK	Task No	
•		File No. 2/947	
Date 3/13/87 Date	3/18/87	Sheet <u>3</u> of <u>4</u>	
		•	
ESTIMATED PRODUCTION	<b>V</b> (1) (2) (2) (2) (2) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4		
D ESTIMATED LOAT		IMED LOAD FACTOR)	
		8 LF = 14.4 CY/LOAD	
		" I TATE Y LOAD	
2) CYCLES PER HO	 v <b>r</b> .		
		) ( /cyc/R/4,47 min ) = 13.4 c	yde
		1 4,4+min ) = 13,7	h
2)			
3) HOURLY UNIT PRO			
	(13.4	-ycks/hr.) x H.4(C.Y/cyck)	
		= 193	C7//
4) NEED I SCRAPER	EVEKY O'S	s minutes	
	, 1 - <del>1</del>	4.47 min /0.8 = 5.59 / USE 6 scrapers /	
		use 6 scrapers /	
5) CHECK PUSH to ?	ZER BALANG	CE	
Doz	er cycle	1.4(0.8)+0.25 = 1.37 min	rute
Sinak	er cuele	4.47	
dozer	eyek.	4.47 7.37 = 3.26	
		handle 6 scrapers.	/ :
	, , , , , , , , , , , , , , , , , , , ,		
6) FIEDT DOORS	ION EFFIC	IENO'& 1009 EFFICIEN	د٧
			•,
6	× 1935/hr	= 1,158 9/hr.	
		en e	
7) ADJUSTED PR	2000CT/OF	n lovel B)	
( \CSE 43	min /hr. For	158 cy/Ar (45/60) = 8705/	hr.
1	•	17717, \ /60/	••

		UDGE REMOURL COSTS	
TEK	Checked By	D. HAWK	Task No. Z
		•	File No. 2/947
te 3/13/8 7	Date	3/18/87	Sheet <u>4</u> of <u>4</u>
EQUIPMENT	CAT 627 CAT 627 CAT 627 CAT 14G LIBOLERS TRACTOR W CAT D-6	COSTS  T B SCRAPERS (B  L DOZERS (B  L DOZERS (B  Standby) (G  MOTOR GRADER (B  MITH DISC ATTACHMENT  DOZER	*/348° = 8088° / /2325 = 493 <sup>20</sup> / 753 <sup>7</sup> = 753 <sup>7</sup> / 9264 = 9264 / 255 <sup>2</sup> / -9997 / -6328 / /65858
	and the second s		efficiency.
	Vo safety con this cost ex		

Haul Clay from Borrow to Stockpile

	EW AND PRODUCT				S/Z/8	E5 7
PROJECT	is form, see TM 5-800-2	2. the propon	ent apency is USA	PREPARED BY	1./-	CREW REF NO
RMA LOCATION 0				D. HAWK		
DENVER, C	>	•		CHECKED BY Tom	kalle-	
		CREW	COMPOSITION			
WORK TYPE	WORK SCHEDULE			SPECIAL INFORMA	ITION CLAY	FROM
EXCAMPLE HAUL	<u> </u>	1	1	BORROW 7	O STOCKAIL	
CREW DESCRI	PTION	NO. REQUIRED IN CREW	431101.70	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (\$/HR)
CAT 245 BAC	KHOE	ı	17 03	1703	14207	142 07
CAT DOL DO	zer	1	1688	16 38	106.37	10637
CAT DOD DO	OZER	l	1688	1688	4640	46 40
MRS 1-1005 TR	ACTOR W/ DISC	1.	1688	1688	8302	8309
10,000 GALLON W	VATER TANKER	ı	179	1709	11902	119 02
END DUMP 18	CY.	11	1709	187 29	4118	452 98
	· · · · · · · · · · · · · · · · · · ·			·		
	•				·	
			·			
	1			76		43
TOTALS	MANHOURS	16	COST	272 75	EQUIPMENT COST	949 93
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE	MH/UNIT	ABOR S/UNIT	EQUIPMENT S/UNIT	COMM	ENTS
EXCAVATE AND HOUL CLAY TO STOCKPILE	310 CY/HR		0 88/24	*306/cy	BASED ON ESTIMATED A	QUANTITY TER PLACEMENT
STRIPPING				048/04		•
TOTAL EXCAPATE,					× 442	lav
HAVE AND STRIP						<i>- - - - - - - - - -</i>
	Nove:	1,500		W.C. (MA)	10.5	0.474.4.4.1/
·	11016	AND	assumes	TE MOIST	HAVL (1-	WAY)
* Including fringe benefits						

2

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Subject EXCAVATED	CLOY COST FOR LANDFILL	Project No. <u>3603554P</u>
By D. HAWK	Checked By	Task No
Date 2/13/87	Date / - / - 7	Sheet of

PRELIMINARY CONSTRUCTION COST ESTIMATES

GIVEN:

- ABOUT 360,000 CY ARE REQUIRED (COMPACTED) - CLAY IN-PLACE @ 100% COMPACTION

  ND = 113.3 pct

  MC = 14%

  - ASSUMED CLAY IN-SITU

  ND = 96.3 pcf

  - CLAY SWELL IN TRUCK = 25% VS compacted

  ND = 113.3 -1.25 = 90 pcf

THUS:

AMOUNT OF MATERIAL IN- SITU REQUIRED 360,00001 × 113.3 3 N = 119. 5 K = 423,500 CY

AREA ASSUMING CLAM IS 5'THICK AND 80°6 USABLE 1 × 423,500 CY × 27 CF × 1 × MRE = 65.6 ALRE

FOR HAULAGE RY VOLUME

 $360,000 \times 113.3 = 453,200 \text{ Cy} 01$ 

Subject Clay borrow Cost Estimate Project No. 86 C 8554 P Task No.\_\_\_\_ Checked By By D. Hank Date 5/2 34 Date 2/13/87 Sheet 2 of 9IN BORROW OD8 DOZER - 1 ca @ 245 Backhoe - Lea 1 Wheel tractor w/ disc 1 Water tanker Support Received south D TRUCKS 1834 5 mile Assume - Strip 1.0' to get to borrow
(2) Clay borrow s' deep
(3) 80% borrow useable De Moisture conditioning included

5 Clay dumped over fence into hot zone

Subject Clay borrow Cost Estimate Project No. 8609554P Task No.\_\_\_\_ By D. HAWK Checked By TCM Sheet \_\_\_\_\_3\_\_ of \_\_\_9\_ Date 3//ン/:フ Date 2/13/87

## EQUIPMENT

TRUCK: Use 6x4/6x2 Diesel Powered Trucks Rear Dump

STRUCK CAPACITY = 12-18 CY MONTHLY RATE = 4130 OC/HR=\$1860/12 OPERATOR = 1709/HR 1984 Aovermont Rare = .901 Regional adjustment-105 SAY 173 HR/MONTH

>1.05×901 × 4130°° ÷ 173 = 22 58 EQUIPMERT 13 60 DPERATING 1700 OPER ATOR 58 27/HR W/ OPER.

BACKHUE: USE CAT 245, HOE W/ 325CY BUCKET 325 HP

MONTHLY RATE #19,69500 OPERATOR = #1703/HR OC/HE = 4130/HZ 1834 ADJUSTMONT RATE = .843 => 1.85x.843x19,695 = 173 = 100 77 Equip 41 30 OPERATING 17 03

159 10/MR W/ DIER.

## CYCLE TIME

BACKHOE CYCLE TIME = 23 Seconds with 3.25 CY BUCKET FROM CAT PERFORMANCE HANDBOOK.

USE 23 SECOND CYCLE TIME WITH 3 CY BULKET

> LOAD TIME FOR 18 CY STRUCK CAPACITY TRUCK

18 C4/3 C4 × 23 SEC = 133 SEC

= 2.3 MINUTES. LOAD TIME 138 SEC/Ain

<b>.</b>
3608554P
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2/947 + of 9
of 9
way)
tes tes tes
Q: a
.3 min -0 mph ,2 mi
.5min 5-0mph .2mi
rinife

Subje	ct Clay borrow	, Cost	Estinate	Project No. 8608554P
	1			Task No
Ву	D. Harek	Checked By	72 -	File No. 2/947
Date	2/13/87	Date		Sheet5_ of9

CALCULATE UNIT RATE / HOUR AND PRODUCTION RATE

CONVERT FROM LODGE TO IN-PLACE AT LANDFILL

Subjec	et Clay bor	row Cost Estimas	Project No.	o. <u>8689554P</u>
Ву	D. Hank	Checked By TEK		<u>2</u> 31947
Date	2/16/87	Date		6 of 9
	ADDITIONA	c Costs		
	) 2) 3)	STRIP 1.0 FT FROM SUPPORT DOZERS MOISTURE CONDIT	TOP TONING	
	D Cos	T OF STRIPPING		
		1.0 FT × 45.6 F	ACRE × 43,560 SF ACRE	÷ 27 = 105,335 cy.
		Feom MERNS 2.3	3-164-0300	
			H SCEAPER EXCA	1VA770N
		UNIT RATE	= #139/cy	
		105,835 x 139/34 UNIT RATE = 200,0	= # 200,000	4 SAY 6 43/64
	=) Aa	ld 2 dozers for p	iroduction time	(torgeth -dugs)
		24 min x cy cycle 18	cy (loss) 11 Teuchs	\$3,200 CY( x 60,000)
		= U5,920 m	in x He = 1 14 60 min 8 #	r.
		= 137 wa	k days	
	·	FROM BLUE BOOK RAM. 1984 ADJUSTMENT RATE SEE ANALYSIS O WELLTING COST OFEN ATOR	= 73 <sup>67</sup> /Hc = 32 <sup>70</sup> /Hc	

Subje	ect Clay barro	nu Cost Estimate	Project No	36C8554P
B.v	D. Hours	Checked By TEK	Task No	_2
·		Checked by	File No	21947
Date	2/16/87	Date	Sheet	7 of9

DGD FOR SUPPORT 140 HP 1984 ADJUSTMENT .910 Equipment -1.05 x 5920 x 910 -173 = 3220 = 13 20 DASKATING COST DPERATUR # 63 28/HC N/ OPER. # 6323/x × 8 mm/DAY = \$50624/DAY FOL DSL & DGD CHIS # (98600 + 50624) x 137 DAUS = # 204,000

Subject Clay borrow Cost Estimate Project No. 8609554P Task No. 2 D. Hawk Checked By TEK File No. \_ =7/947 Sheet \_\_\_\_\_\_\_ of \_\_\_\_9\_ Date 2/14/87 Date 3) PROCESS CLAY FOR MOISTURE CONTENT USS I TRACTOR WITH DISC AND I WATER TRUCK Use 10,000 gal water tonker, off- highway 330HP 1984 RATE ADJUSTMENT = 1883 EQUIPMENT .883.15,5750 x1.05:173 = 8347 = 3555 OPEXATING - 1700 OPERLATOR # 136 4/AR W/ OFFICE 137 × 8 × \$ 136" = \$149,000 ASSUME WATER PROVIDED IN-SITE BY RMA UsE I wheel tractor w/ disc attachment USE MRS 1-1005 310 HP WHEEZ TRACTOR W/dise 1984 RATE ADVUSTATION EQUIPMENT . 877.494050 + 173 +1.05 =50 00 OPERATING Dronator DISC ROWTH 400 2 x 877 x 105 - 173 = 213 OPERATING # 99 17 MR W/OFER. 137 DAYS X 8 WES/DAY × 99 97/112 = \$110,000 TOTAL = \$110,000 + 149,000 = \$259,000

Subject Clay borrow Cost Estimate Project No. 86095540 Task No. By D. Hawk Checked By TEK Date 2/16/87 Date

TOTAL COST TO EXCAVATE AND PROCESS CLAY #25 /cy × 360,000 # 428,800 200,000 259,000 1,591,800 UNIT RATE # 1,591,800 = # 4 42/cy Clay - Stockpile to Cap Basin F

CRI	EW AND PRODUCT	TIVITY WO	RKSHEET		DATE PREPAR	
For use of the	s form, see TM 8-800-	2: the presen	ent approcy is USA		1 3/18,	/ <del>3</del> 7
PROJECT RMA				PREPARED BY	KELLEY	CREW REF NO
LOCATION DENVER		CHECKED BY	- w 2/0/a-	1		
	,			1 2.72	WK 3/18/87	
	·		COMPOSITION	•		
EXCRUATION	WORK SCHEDULE			SPECIAL INFORMA	TO CAP BA	
٥	•		LA	OR COST		ENT COST
CREW DESCRI	PTION	NO. REQUIRED IN CREW	HOURLY* RATE (B/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (2/HR)
CAT 627B SCR	APER .	8	1703	13624	11737.	94216
CAT DOL DO	ZER	.3	1688	5064	10637	3194
CAT 825C 6	MPACTOR	1	1688	1688	9052	90 <sup>52</sup>
10,000 gallon WAT	ER TANKER	1.	1709	1703	11902	11902
CAT 14G MOTO	e Grader	1	1703	1703	7561	7561
MRS 1-1005 TRA	CTUR W/DISC	/	/6 <u>8€</u>	1683	8309	83°º
LABORERS		3	1276	3828		
CAT 6278 SCRAPE	irs (Standby)	2	-	•	75 <sup>37</sup>	15074
			·			-
TOTALS	MANHOURS	18	LASOR COST	29304/	EQUIPMENT COST	178025
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY	L.	ABOR	EQUIPMENT		
EXCANATION /	UNIT/HA	MHVUNIT	SUNIT	8/UNIT	COMM	ENTS
PLACEMENT	1.176 ccy/h.		025/	151/cm		٠
SAFETY	1176 cc//r.		020/01	049/1		•
				-		
TOTAL EQUIPMENT,					# 2 <u>45</u>	lec.
						2
*Including frings benefits	1	<u> </u>			<del></del>	

DA FORM 6418-R, Apr 85

C	REW AND PRODUCT	FIVITY WO	RKSHEET		DATE PREPAR	EC
For use of t	this form, see TM 5-800-2	2: the presen	ent eponcy is USA	ICE.	3	-18-87
PROJECT	•			PREPARED BY		CHEW HEF NO
LOCATION					ELLEY	
DELIVE	D .c 🔿	•	•	CHECKED BY	3/18/87	1.
	<u> </u>			D. 17	3/10/01	<u> </u>
		CREW	COMPOSITION	•		
WORK TYPE	WORK SCHEDULE	į		SPECIAL INFORMA	TION CLAY-	STOCK PILE
SAFETY			<u> </u>			BASINE
	•		LAT	BOR COST		ENT COST
CARW DESCR	HPTION	NO. NECLARED IN CREW		FOR CREW . (S/HR)	MOURLY RATE (S/HR)	TOTAL FOR CREW (E/HR)
HEAVY EQUIPI	MENT	15			3820	5 73 00
STANDBY EQ	OUIPMENT	2	_		445	899
LABORERS		3	7805	23415		
	•		·			
			. 4			·
				<u>.</u>		
	<u> </u>		<del></del>			
		-				<u> </u>
		-				
TOTALS	MANHOURS		LASOR COST	23415/	EQUIPMENT	5.8190
		CREW PI	RODUCTIVITY	<u> </u>		
mar tage	PRODUCTIVITY	E.	ABOR	EQUIPMENT		
WORK TASK	RATE UNIT/MR	MH/UNIT	S/UNIT	S/UNIT	COMMI	ENTS
SAFETY	1176 cc//hr.		02/14	1049/ey/		•
	·					
	·				·	
·	·	·				•
*Including frings penalty		<u> </u>				

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-					IN F CONS		Project No	
<b>/</b> ).	Ho			Checked B	Tok		Task No	2
<b>.</b>	HA	<i>~</i> ~		CHECKEU B	y '\		File No	21947
e S	3/10/8	87		Date 3	12/87		Sheet	of#_
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By D. HAWK	Checked By 75 K	Task No.	
		File No	
Date 3/10/87	Date 3/12/37	Sheet of4	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
5190 200' 800' BO		0% GR 10% BR	0S
<u> </u>	CHUE TIME (CAT	UNLOADED UNLOADED TIME TR TIME	
25 mph assoned C	800' 5% 400' -1%	.31 10% .23v ~ .65 5950 (a) .18 1% .38 ~ .31 10% .23	S S
(25 mph assoned) C	800' 5% 400' -1% 200' 10%	(a) .18 9% .50 (b) .18 9% .38 -31 10% .23° 1.45 min 1 1.34 m	) ) ~
(25 mph assoned) C	800' 5% 400' -1%	(a) .18 9% .50 (b) .18 9% .38 -31 10% .23° 1.45 min 1 1.34 m	) ) ~
TOTAL CYC  HAUL  RETU  LO M  MANE	800' 5% 400' -1% 200' 10%  W/ 93% Altitude Cerution  LE TIME  = 1.5  en = 1.40  uvee & Dump = .6	65 5% .50 (a) .18 9% .38 31 10% .23  1.45 min 1.34 m  1.56 min 1.44 m	) ) ~

Subject Executions Cost - Reside F Construction Project No. 86 C8554 P  By D. HAFWE Checked By T. K. Task No. 2  File No. 21947  Date 3/10/87 Date 3/12/87 Sheet 4 of 4  Equipment List and Costs  D. B. Car 627 B Scenars C 134 B = 4078 b' 2) 3 CAT DBL DUESTS C 122 S = 36975', 3) 1 CAT BSC Compartor C 107 B = 1079', 4) 1 WATER THIS EXCLOSOROUS BSC = 122 b' 5) 1 Out 14 A more classe Q 92 by = 92 by 1) 2 CAT 627 B Scenars (STANDOT) P 75 12 = 15012', 2) 3 CAT 627 B Scenars (STANDOT) P 75 12 = 3820'  **2073 22/HZ + 1176 CY/HZ = 4, 26/24'  **LINT COST OF CLAM PARCETISMY DDE BAGIN F CAP  **2073 22/HZ + 1176 CY/HZ = 4, 26/24'  **LOTE: THIS COST IS WITHOUT SAFETY CONSIDERATIONS BROWN THEOLOGY OF 15/40.	Subject EARTHWORK	COSTE- BASIN F CONSTRUCT	<u>ze</u> Project No. <u> </u>
Date 3/10/87  Date 3/10/87  Date 3/12/87  Sheet 4 of 4  Equipment List mus Costs  D B CAT 627 B SCRARZES @ 134 B = 4/078 \( \text{1078} \)  2) 3 CAT DBL DOZESS @ 123 \( \text{25} \) = 369 \( \text{25} \)  D I CAT 825 C Commetor @ 107 \( \text{25} \) = 107 \( \text{25} \)  1) WHITE THINKEL (0,000 CA) @ 136 \( \text{25} \) = 132 \( \text{27} \)  3) I CAT 14 4 MOTOR CRASTE @ 92 \( \text{27} \) = 92 \( \text{24} \)  1) I TRACTOR W/DISC ATTRIMENT @ 99 \( \text{27} \) = 150 \( \text{28} \)  3) 3 CAT 627 B SCRARZES (STANGA) @ 75 \( \text{27} \) = 150 \( \text{28} \)  3) 3 CAT 627 B SCRARZES (STANGA) @ 75 \( \text{27} \) = 33 \( \text{25} \)  4 2073 \( \text{29} \)/HR  4 2073 \( \text{29} \)/HR \( \text{27} \) 1746 CY/HR \( \text{27} \) = 175/CY  4 NOTE: THIS COST IS WITHOUT SAFETY CONSIDERATIONS	n M Harry	Charles Tik	Task No
EQUIPMENT LIST AND COSTS  D B CAT 627 B SCRAPES & 134 & = 41078 \$  2) 3 CAT DBL DOZES & 123 = 369 5  3) 1 CAT 825 C COMMETTER @ 107 \$  4) 1 WATER TANKER (10,000 CAN) @ 136 \$  5) 1 CAT 14 4 MOTOR CRAOSE @ 9264 = 9264,  5) 1 CAT 14 4 MOTOR CRAOSE @ 9264 = 99 97,  1) 2 CAT 627 B SCRAPER (STANSON) @ 75 \$  3) 3 LARDEERS @ 12 \$  \$ 2073 \$  \$ 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  # 2073 \$  #	By D. MACC	Checked By	File No
EQUIPMENT LIST AND COSTS  D B CAT 627 B SCRAPES & 134 & = 41078 \$  2) 3 CAT DBL DOZES & 123 & = 369 \$  3) 1 CAT 825 C COMMETTOR @ 107 \$  4) 1 WATER TANKER (0,000 GA) @ 156 \$  5) 1 CAT 14 G MOTOR GRADER @ 92 \$  4) 1 TRACTOR WY DISC ATTRITMENT @ 99 \$  7) 2 CAT 627 B SCRAPER (STANGOL) @ 75 \$  8) 3 LARDOERS @ 12 \$  4 2073 \$  4 2073 \$  4 2073 \$  4 2073 \$  4 2073 \$  4 2073 \$  4 2073 \$  4 2073 \$  5 HR + 1176 CY/HR = 4,76/CY \$  4 NOTE: THIS COST 15 WITHOUT SAFETY CONSIDERATIONS	Date 3/10/87	Date 3/12/87	Sheet of
# 2073 22/HZ + 1176 CY/HZ = 4,76/CY + / ** NOTE: THIS COST IS WITHOUT SAFETY CONSIDERATIONS	Equipment La 2) 3 CA 3) 1 CA 4) 1 W4 5) 1 OA 1) 2 CA 8) 3 LA	ST MUD COSTS  T 627 B SCRAPPES C 13  T DBL DOZES C 12  T 825 C COMPACTOR C 16  TER TANKER (10,000 GA) C 15  T 14 4 MUTTER GRADER Q 9  CHOR W/ DISC ATTACHMENT C  T627 B SCRAPPES (STANSON) C  BOLERS C	$ \begin{array}{rcl} 4 & = 4/078 & = 369 & = 507 & = 369 & = 507 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 & = 369 $
	# 20	073 29 /HZ + 1176 CY/HA	SAFETY CONSIDERATIONS

SubjectEnergy	LOKK COSTS - BAKIN F CONSTR.	<u> летж</u> Project No. <u>86 С8554Р</u>
By D. Hawk	Checked By TC K	Task No
		File No
Date 3/10/87	Date 3/12/87	Sheet3 of4
ESTIMATE	- PRODUCTION	
) E	STIMATED LOND 18 LCY X	0.K.
		LOAD
: '		
2) C	yels took took to min -	- 4.40 min = 13.6 cycles
3) H	DURLY PROJUCTION RATE = 14.4	CL4 x 13.6 LOND = 196 004/
		LOAD HE HE
4) N	HED ONE SCENE EVERY ON	L minutes inutes = 7.3 scrapeus. Use 8
		avier - "3 wiper. use o
5) (	CHECK PUSHOR COMBINATION	
		/
	Posher Cycle Time	= 1.4(.0 + .25 - 1.09  min)
	SCRAPER CYCLE TIME  3 4.40/1.09 =	4.0/
	Each dozer ca	m handle 4.0 scrapers 101
	war en	
6) H	DURLY FLETT PRODUCTION	
	B SCPAPERS X 196	cey/HR = 1568 ccy /
		HE
	<u></u>	121
<b>7)</b> A	OUUSTED PRODUCTION - (USE	45/60 EFFICIONAL TO ACCOUNT 20 LEVEL B Protection
	For	HEIST B Protection
	45/60 × 1568 CC4/A	125 1/76 CCY/HZ
s) C	HER COMPACTION BALANCE	I CAT 825 C @ smph w/6"/ifts, 3
	PRODUCTION = 1444	
	A TOUR OFFICE A	gu
	ALTITUDE DEPARTON = EFFICIENCY = 45	160
		· · · · · · · · · · · · · · · · · · ·
		0 = 1018 CY/Hz < 11760
	HISSUME ADDITIONS	ar compaction from
	SCRATERS! WATE	or tanker or B.K.

- Stockpiled Clay to Waste Pile Bottom Clay Liner Stockpiled Clay to Waste Pile Berms Stockpiled Clay to North Lagoon Liner Stockpiled Clay to Leachate Lagoon Liner

	W AND PRODUCT				3-18-1	
PROJECT	form, see TM 5-800-2	the propon	ent apency is USA	PREPARED BY	3-10-2	CHEW REF N
RMA				D. HAWK		
LOCATION				CHECKED BY		
DENVER, CO				1. Kelley	3/18/8=	•
		CREW	COMPOSITION	·		,
NORK TYPE	WORK SCHEDULE			SPECIAL INFORMA	TION STOCK	PILED
EXCAVATION PLACEMENT				CLAY TO LA	VDFILL CLA	LINER
			LAI	OR COST	EQUIPM	ENT COST
CREW DESCRIP	TION .	NO. REQUIRED IN CREW	HOURLY* RATE (\$/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (\$/HR)	TOTAL FOR CREW (\$/MR)
CAT 627 B Sc.	eapers	9	17 03	15327	117 27	10599
CAT DEL DO	zees	3	16 88	50 64	104.37	319-11
CAT 825C Co	MPACTOR	,	16 88	16 88	9052	9052
10,000 gallon Wa	TER TANKER	1.	17 09	1709	119 02	11902
CAT 14 4 MOTE	OR GRADER	1	1703	1703	75 61	7561
MRS 1-1005 TE	ACTOR W/DISC	,	1698	16 28	83 <u>4</u>	83° <u>9</u>
LABORERS		3	1276	38 28		•
CAT 627 B SCRAPERS (STANDEN)		2			75 37	15024
TOTALS	MANHOURS	19	LABOR COST	310 <u>87</u>	EQUIPMENT COST	1898 02
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	L MH/UNIT	ABOR S/UNIT	EQUIPMENT S/UNIT	СОММ	ENTS
EXCAVATION PLACEMENT			1030/cy	#181/cy		•
SAFETY	1050 CY/HR		#0 <sup>22</sup> /c4	*059/cy		•
OTAL EquiPMENT   ABOR ! SAFETY					- #2 <sup>92</sup>	:/cy
ncluding fringe penefits	•					•

DA FORM 5419-R, Apr 85

CR	EW AND PRODUCT	DATE PREPARED				
For use of th	is form, see TM 5-800-2	CE.	3-18-	87		
DOOLECT				PREPARED BY		CREW REF NO
RMA		•		D. Harri	) K	ì
1.00421041	0			CHECKEDON		- ·
DENVER,	$\mathcal{C}_{\mathcal{O}}$ .	•		T Kalio	y 3/18/27	
		CREW	COMPOSITION	1. Reic	<del>y</del>	
WORK TYPE	I many coursely s					
	WORK SCHEDULE			SPECIAL INFORMA		
SAFETY				CLAY TO LAN		
	•	NO.	LAS	OR COST	EQUIPM	ENT COST
CREW DESCRI	CREW DESCRIPTION .		HOURLY® RATE (8/HR)	TOTAL FOR CREW (S/HR)	MOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)
HEAVY EQUIPA	1ENT	14			38 20	61120
STANDBY EQU		2			445	890
LABOR		3	78°5	23415		
		٠				
			and the sales which the same page, as the sales and			
TOTALS	MANHOURS		LABOR COST	23415	EQUIPMENT COST	62010
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	L MH/UNIT	ABOR S/UNIT	EQUIPMENT \$/UNIT	COMM	ENTS
SAFETY	1050 CY/HR		40 22/cy	*059/c4		·
						•
					···	
	·				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
			·			
*Including fringe benefits						

Subject LANDFILL CONSTRUCTION - EARTHWOLK COSTProject No. 86CESS4P Task No.\_\_\_\_\_ Checked By T. By D. HAUK Date 3 Date 3/6/87 CLAY TO LANDFILL CLAY LINERS

10% GL

RETIMATED CYCLE TIMES

<b>3</b> ,000		LOADED		UNWASED	
SECTION	LENGTH	TR	TIME	TR	TIME
A B C D	200' 750' 600' <u>300'</u> 1850'	10% 0% 10%	.30 .45 .52 <u>.41</u>	10% 6% 10%	.25 .50 .45 <u>.32</u> 1.52

4,60 min

@ 93% efficiency (altitude adjustment) = 5.0 min

). HAWK 3/6/37	Checked By  Date	File No	2 31947 2 of 5
 _			
Need one	scraper every 0.6	minutes	_
	5.0 min/cycle + 0 D&L push CATS	9.6 minut® = 8. U5e	3 scripers
Use 2	D&L push CATS	for nine scray	ees U
	Check balance		
	RETURN TIME	= 0.1 min = .4x(.6) =	
	Maneuver Load Time		= ./5
			1.09 ming
	Scrapen Cycle = Push Cycle =	5.0 min	,
			50 = 450
		CAT can handle PUSH CATE CAN HAN	

Subjec	LANDFILL C	ONSTRUCTION - EA	ETHWORK COSTS	Project No 80	6C 8S54P
_	D. HAWK	Checked By		Task No	೨
БУ	D. IIIOC	Checked by		File No.	1947
Date	3/4/87	Date = / 1 = 14		Sheet3_	
	PRODUCTION	****			
	WITH	9 scrapus ha	Ling @ 18	LCY/LOAD	
	From	GEOTECHNICAL	LUFURM ATTON	)	
		Clay @ 100% c Ob+. Mc	onPactium As	TM-D-678	= 113.3 pcf = 14.6%
		SAY 113	pct ; 1	= % Mc	
	Loas	FACTOR FOR	Clay =	0.8 Ass	sumad ·
		:. 18 LCY	x .8 = 14	1.4 Cy/m	D*C
			4 C4/LOA		1
	Cyali	E TIME &	5.0 minutes	@ 100%	efficiency
	P	edovenon = g	He Cy	zin = 12 pole	cycles Ar/unit
	U	it PRODUCTION =	14 <u>CC4</u> × 1°	z eyeles =	168 <u>cy</u> He
	Aı	SUSTED PRODUCTION	168 24	1 x 45 min 2 60 mist	= 126 <u>CY</u>
			6. 7		:

FLEET PRODUCTION B.3 UNIS × 12604 = 1050 CY (compacted) He/UNIT HE

Subject / PAIDEIC	CONSTRUCTION - EARTHWORK COSTS	E Project No. 9528554P
Subject		Task No 2
By D. Hawk	Checked By	,
4/-/	14 1 <b>7</b>	File No. <u>2/947</u>
Date \$/7/37	Date 111117	Sheet of 5
Equi	PMENT LIST	
Nore	9 CAT 627 B SCRAPERS 3 CAT D8L DOZERS 1 CAT 825 C COMPACTOR W 1 DIESEL POWERED WATER 1 CAT 144 MOTOR GRAPE 2 CAT 627B SCRAPES ( 1 TRACTOR W/ DISC ATT 3 LAROXEE (SFOTTES - GRE E: ALL EQUIPMENT COSTS DE FOR GENERAL FILL EXC	STANOBY) TACHMENT PADE CHECK) ETERMINED ACEVIOUSLY
	TRACTOR W/ DISC ATTACHMENT  USE MRS 1-1005 310  Equipment 940500 x mo  MO 175  DECENTING 3035	
	DREKATER 1688 NE	= 168/11 TOTAL #97 #1
	DISC ATTACHMENT (MEANS 1985	. 1
	Equipment 400° x Mo 1.  OPERATING OFF  OPERATOR O	$\frac{10}{73(HW)}$ = $\frac{2^{13}}{14\pi}$ = $\frac{0.55}{14\pi}$
		TOTAL 263/

Subject LONDENCE CONTRACTION - EARTHWINE COSTS Project No. Bolgary P Task No.\_\_\_\_ Checked By By D. HAWK Date = /1 / == Date 3/1/87

## CLAY LINER RACEMENT COSTS / HOUR

Stockpiled Clay to Waste Pile Top and Side Clay Liner

Subject	COVER PLACEMENT	Project No. <u>86C8554P</u>
By D. HAWK	Checked By TEK	Task No. 2 File No. 21947
Date 3/20/87	Date 7/13/97	Sheet/ of/

CLAY COVER PLACEMENT FOR TOP AND SLOPES OF THE WASTE PILE

- 1) PLACEMENT MUST BÉ CAFEFULLY PERFORMED BECAUSE IT IS ABOVE SYNTHETIC LINERS
- 2) PLACEMENT WILL BE SIMILAR TO SAND DRAIN PLACEMENT; HOWEVER, A COMPACTOR WILL BE REQUIRED AND MATERIAL COSTS WILL BE SIMILAR TO THAT FOR OTHER CLAY PLACED.
- 3) FOR CLAM COVER CREW

From SHEET O OF EQUIPMENT COSTS FOR CAT 825 C COMPACTOR

a) Labor	= 1688
b) Equipment	= 16 <u>88</u> = 90 <u>52</u>
c) Safety on Labor d) Safety on Equipment	= 3820
TOTAL COST	= 41598 64/HR
D	- 201 CY/40

COTTON GOST (FROM ACTIVITY (D)

	W AND PRODUCT of form, see TM 5-800-2			\C\$	3-18	16 -a 7
PROJECT RMA				T. KEL		CREW REF NO
LOCATION		•		CHECKED BY		•
DEHVER	, C.O		COMPOSITION	D. HALL	3/18/87	1
WORK TYPE	WORK SCHEDULE	Cutt		SPECIAL INFORMA	TION SUPPLY	AND PLAC
EXCAUATION/PLACEMENT	<u> </u>	1	I	SAND DRA	INS	
CREW DESCRIP	PTION	NO. REQUIRED IN CREW	H01101 V1	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (8/HR)
CAT DEL D	∞zer	1	1688	1688 .	10637	10637.
CAT 9660 L		1	/6 <u>88</u>	1688	61 10	610
12 CUBIC YARD EN	D DUMP TRUCK	4	1678	67/2	3730	14920
CAT D6 D0	ZER	2.	16 <u>88</u>	3376	4640	9280
CAT 14G MOTO	OR GRADER	1	1703	1703	7561	7561
10,000 gallon WATE	R TANKER	1	1709	1709	11902	11902
LABORERS		3	1275	38 28		
END DUMP TRUC	(STANDBY)	1		CANCEL STREET,	21 <sup>30</sup>	2130
TOTALS	MANHOURS	13	LASOR COST	207041	EQUIPMENT COST	62540
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE		ASOR	EQUIPMENT	COMM	ENTS
EKCAVATION	25 1 CY/HR	MH/UNIT	# 082/V	#249//		•
PLACEMENT SAFETY	251 CY/HR.		109311	154/		<del></del>
MATERIALS DELIVERED	, , , , ,		- Jey	1 /CY 8,020 / /		•
TOSTOCKPILE				102 /cy		
TOTAL EQUIPMENT,					#	
MATERIALS, LABOR, SAFETY					\$1598/c	Y
	•				······································	
*Including frings benefits						
DA FORM SATER, Apr 85		···				



, CR	EW AND PRODUCT	TIVITY WO	RKSHEET		DATE PREPAR		
For use of the	s form, see TM 8-800-	2: the ereson	ent opency is USA	CE.	3-18	3-87	
PROJECT RMA				PREPARED BY	KELLEY	CREW MEF NO	
LOCATION DENVER, C	.0			CHECKED BY	<del></del>	<b>j</b>	
				٠. ٠. ١	HAWK 3/18/8	7.	
WORK TYPE	1 22 22 22 22 22 22 22 22 22 22 22 22 22		COMPOSITION	·			
SAFETY / UT THE	WORK SCHEDULE	i		SPECIAL INFORMA	DRAINS	AND PLACE	
	•		LA	OR COST EQUIPMENT COST			
GREW DESCRI	PTION	NO. REQUIRED IN CREW	HOURLY' RATE (S/HR)	FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)	
HEAVY EQUIPMEN	Τ	10			38 ≥	38200	
STANDBY HEAVY	EQUIPMENT	1			445	4 45	
LABORERS	,	3	78°5	23415	_	-	
		·					
			•			·	
·							
<u> </u>							
			•		٠		
	<del></del>						
TOTALS	MANHOURS		LASOR COST	234/5	EQUIPMENT COST	3862	
•		CREW PR	ODUCTIVITY				
WORK TASK	PRODUCTIVITY RATE		ABOR	EQUIPMENT	COMM	Earte	
SAFETY	25 1. CY/HR	MH/UNIT	93/14	\$/UNIT			
JAFE! Y	231 THR		O. My	Tod			
						•	
	e.						
	•	·					
						·	
* Including frings benefits							

DA FORM S418-R, Apr 86

Sheet \_\_\_\_\_ of \_\_\_

Subject LANDFILL CONSTRUCTION - EARTHWOLK COSTS Project No. BGCB554P Task No.\_\_\_\_ By I. HAWK Checked By File No. \_ = 1947 Date 3/7/87

PLACEMENT OF SAND DRAIN SUSTEMS

Date /

THE WASHED SAND REQUIRED WILL BE ORTAINED From OFF-SITE. THE MATEUALS WILL BE DELIVERED BY THE SUPPLIER TO THE LEVEL B LINE AND DUMPED FROM A RAMP ALLOSS TO A SAECIFIED STOCKALE ACED. THE STOCKPILE AREA WILL BE FREPARED LIENG CLEAN GENERAL FILL, IT IS ASSUMED THAT 10% OF THE WASHED SAND WILL BE WASTED BELAUSE IT WILL BECOME MIXED WITH FINES IN THE STOCKFILE (PRIMARILY AT THE STOCKALE GASE)

A DORER WILL BE REQUIRED TO WICK THE STOCKPILE SO THAT CONTINUAL DUNIDING MAY OCCUR. DINCE IN THE BASIN, THE SAND WILL GE LOADED WITH FEDAT. END LOADERS INTO TRUCKS AND CARRIED TO THE LANDFILL WHERE IT WILL BE DUMPED AND THEN SPRETAD USING DOTECTS AND MOTOR GRADERS. COMPACTION WILL BE PERFORMED BY SEVERAL PASSES WITH A TRACKED DOZER AND MOISTURE LODED WITH A WATER TRUCK. SEVERAL SPOTTERS WILL BE REQUIRED IN THIS DREZATION TO POSITION TRUCKS AND CHECK GEADES.

LIGHT TRUKES SUCH AS TEN-TWENT CUEIC YALL TANDEMS WILL BE USED FOR HAULING SAND IN LAZIN F BELAUSE THEY WILL BE KUNNING OVER LINER WITH DNLY 1-FOOT OF COMER. POSSIBLY MAY BUILD HANK ROADS OF CONTRAC FILL OUT OVER SAND DRAINAGE BLANKET TO ALLOWS TRUCKS TO GET CLOSE TO CUMPING POPUT WITHOUT DAMAGING LINER. HAVE ROAD WOULD PROPROLY BE 1 TO 2 FEET OF GENERAL FILL OFFICE I FOOT DRAINSMID.

Subject LANDFILL CONSTRUCTION - EARTHWORK COSTS Project No. \_86C8554P Task No. \_\_\_\_\_ Checked By By D. HAWK File No. \_\_\_\_\_ 21947 Date 3/1/87 Sheet \_\_\_\_\_\_ of \_\_\_\_\_ Date 2/-/- +

COST OF SAND DRAIN MATERIAL FROM SUPPLIER

ATTACHED ARE PRICE QUOTES FROM SUPPLIERS FOR WASHED JAND DELIVERED TO RMA FILTER MATERIAL COOH CLASS A, B OR C PROBABLY ACCOUNTE PALE 701 COOH SPECS 1981

COST OF MATERIALS (DELIVERED)

SUPPLIER	Have	TYPE	Cost Cost
MOBILE PREMIX (THORNTON)	5 mi 5 mi 15 mi	GRANTLIK'-	4/70N 4/35/70N 750/70N 4/35/70N 750/70N 4/85/70N
ALBERT FRET Y SONS (HENDERSON)	5 mi 5 mi 5 mi	E C Road Bed I	425/2W 425/2W 625/2W
BENKMAN WOODWACD CONSTRUCTON (HENDERSON)	5mi Emi	FILTER SAND ROAD BASE	# 455 from

FROM QUOTED INFORMATION ASSUME MATERIAL AT PLANT WILL COST \$400/TON

DELIVERY WILL PROCABLY BE FROM WITHIN 6 MILE RADIUS OF RMA AND ASSUME 4 MILE ON-SITE MANL.

DELIVERY WILL BE AROUT 10 MILES @

: 44 eston + 10 miles x 020 TON-MILE = 46/10N

USE 3400 lb/cy IN-PLACE/ "10/TOD \* TON/2000 \* 2400 /cy = \$1020/CY

Subject ANDFILL	CONSTRUCTION- EMETHWORK CO	STS Project No. 86C8554P
By D. Howk	Checked By TCK	Task No
, <i>2. /140</i> 22		File No
Date 3/7/87	Date 3/11/87	Sheet3 of6
A CH	TRUKES ARE 12 CY THE USE O.Z Migutes for first \$70,2+ 2 × 0.40 mine \$966 C has no derat	of EFF 4x 3/60= 3.3507/LOND O.K  O.K  O.K  O.K  O.K  O.K  O.K  O.K
	STOCKFILE TO 1700' FOR S	LANDFILL WHICH WAS
	LONDED HAVE = 2000	
	How Long	1.75
		1.42 5.37 min Say 5.4 min
	EXCHANGE AND LOAD = 1.5 M	in and with 5.4 min leyele 3.6 USE 4 TRUCKS

Subject LAND FIL	L CONSTRUCTION- EXETHEREX COST	s Project No. <u>86 C8554 P</u>
By D. HALLIC	Checked By TEK	Task No.
y 9. HAME	Ollecked by   C /	File No
ate 3/7/87	Date 3/11/87	Sheet of
	•	
Est	MATE PRODUCTION	,
1	AVL HAUL = 10 CY LOOSE	
	LOAD FRUTE SAND = .9	
	AVL HAUL = 10 CY LOOSE / LOND FROME SAND = .9 :. 10 CY HAULED = 10(.9) =	9 cy IN-MALE
<u> </u>	UNIT PRODUCTION @ 100% Effici	
	1 doed / 5.8 min x 9 cm . 1	0 min - 93 C1/
	5.8 min Long	He /H2 - UNIT
	, B	
a and a second of the second of	we actually have only 36 unit effectively	its havling in eycle
	effectively v	9 0
	PRODUCTION = 3.6×93 0  PRODUCTION of INSTRICTIONLY	1/He = 335 c1/HR
	=> PLOOIUTION Y INSTAUDING	766 = 333 = 23/3
and and the contract of the co	ar - mainin a <u>minin ny</u> ny aona araona ao	
	WIP MENT LIST	
	1 CAT OSL TO WOLK STOL	vous /
, m •	1 CAT 94 D TO LOND &	STOCKPILE
	4 12 cy TANDOM ARLE	DO DUMES!
	2 CAT DU DOZERS TO SI	
	1 CAT 144 MOTOR GEAR	
	1 10,000 GALLON WATER THE	UKER FOR MOBIUME
The second secon	1 STANDEY TANDEM AZLE	•
	3 LABORS (SPORTES & 48	MAR CHECKOES)
The second secon		

Subject LANDFILL CONSTRUCTION - EARTHWORK COSTS Project No. 3603554F Task No.\_\_\_\_\_ Checked By T & By D. Hawk 21947 File No. \_\_\_\_ Date 3/8/87 111. -Sheet \_\_\_\_ 5 of 6 Date EQUIPMENT & LABOR COSTS 1) CAT DBL \$123 25/HR 2) CAT 966 D LOADER (200 HP) 7490 mo. \* /173 Hes = .891 × 1.05 = 4050/AR EQUIPMENT = 2000/HR = 1688 200/m OPERATING 16 33 /mg OPERATOR. 77 98/H TOTAL 5) TANDEM AXLE END DUMP P4 20-8 6x4 W/BOXE AXLE (300 ME) 394500/mo x m/173 M25x .901x 1.35 = 2/30/HRV Equipment 1600/42 1078/42 DPERATING = 160 /HR OPERATOR = 16 28/HZ OPERATING TOTA L 4) CAT D6 DOZERS (140 HP) 32 70/He EQUIPMENT \$59200 x 1 mo/73 HE . 910x 1.05 = OPERATING = 13th /HR = 1633/AR OPERATOR = 1688/HR = #63 28/Hz TOTAL 5) CAT 144 MOTOR GEADER = # 9264/He 6) \*WATER TANKER (10,000 GALLOW CAPACITY) 45040 = 1364/HM #2/30/H 7) STANDAY TANDEM ALLE END DUMP 0/2 75/4 9) LABORERS (GROUPI)

\* NOTE - COSTS GENERATED IN GENERAL FILL BOT CARCULATIONS

lo D
_
= 7233
= 77
= 216
= 126
92=
= 136
= 2/
= 38
. ************************************
- 4/02/
704 = 4332/8
= 13 =
= 137
= 137
= 1/3 <del>7</del>
1_CONSIDEZA770
1_CONSIDEZA770

• Waste Pile Select Fill

GRI	W AND PRODUCT	TIVITY WO	RKSHEET		DATE PREPAR	
PROJECT	s form, see TM 5-800-	2: the presen	ent opency is USA	PREPARED BY	3-	18-87
RMA				T. k	ELLEY	CHEN HEF NO
LOCATION	•	<del>-</del>		CHECKED BY		-
DEHVER	,co	•		D. Har	DK 3/18/87	
			···		7 /0.	<del></del>
	•		COMPOSITION	•		
WORK TYPE	WORK SCHEDULE			SPECIAL INFORMA	TION GENER	AL FILL -
EYCAVATION/PLACEMENT						o STOCKPILE
٠	9			POR COST	EQUIPM	ENT COST
CREW DESCRI	TION	NO. RECLINED IN CREW	HOURLY' RATE (S/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)
CAT 9660 LC	DADERS	2	1688	33 75	61/2.	12220
CAT DBL D	DZERS	3	1688	50 <del>64</del>		31911
18 WER AND END E	DUMP TRUCK	5	17:09	85 45	4113	20590
LABORERS	•	3.	1276	3828		
18 CUBIC YARD END P	UMP (STALDBY)	1			2258	22 58
	1					
TOTALS	MANHOURS	13	LASOR COST	20813/	COST	66921
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE	L	ABOR	EQUIPMENT	77	
	UNIT/HR	MHVUNIT	S/UNIT	S/UNIT	COMM	ENTS
PLACEMENT	548CLY/UR		038/cy	1/22/07		·
SAFETY	548CCY/HR		Carrier	02//		•
TOTAL EQUIPMENT, LAROR, SAFETY					1 81./cy	V
	•	·				
*Including frings sensitis						

. •	CREW AND PRODUC	TIVITY WO	RKSHEET		DATE PREPAR	EE
For use of	this form, see TM 8-800-	·2: 1140 proces	ent aponcy is US	ACE.		8-87
PROJECT	•			PREPARED BY		CREW MEF NO
P.M.	<u> </u>			TIKE	LLEY	
LOCATION DENVE		•	•	CHECKED BY		
DENVE	E 1 CO			D. Haw	NK 3/18/87	1.
1					7 /	
		CHEN	COMPOSITION	•		
WORK TYPE	WORK SCHEDUL	B		SPECIAL INFORMA	LTION GEHERA	AL FILL -
SAFETY					BORROW T	
	٥	I	LA	OOR COST		ENT COST
CREW DESK	CRIPTION	NO. REQUIRED IN CREW	HOURLY® RATE (E/HR)	FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)
HEAUY EQUIPM	ENT ( LEVET D)	8		Chinaman,	445.	3560.
HEAVY EQUIPM	NENT. (LEVEL B)	2			38 20	7640
HEAVY EQUIPME		· 1			445	445
	o					
			٥			·
+2 CAT DOL	. ठेळ्टकर १४	LEVEL	B cono	ATTONS ALL	OTHER	
	NY EQUIPMEN			1		
TOTALS	MANHOURS		LAEOR COST		EQUIPMENT COST	116 45
		<del>,</del>	RODUCTIVITY			
work task	PRODUCTIVITY	MHVUNIT	ABOR	EQUIPMENT	COMM	ENTS
	UNIT/HR		\$/UNIT	S/UNIT		
SOFETY	548 Ccy/HR			#021/en	İ	•
				107	·	•
	•					
						•
* toctuding to in a second		<u>ı.                                      </u>				
*Including frings benefits						

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ject <u>EARTHWOA</u> D. HAWK	Checked By TEK	<b>Та</b> sk No. 2 1947  File No. 2/947
3/11/87	Date 3/12/87	Sheet of
GENERAL	FILL - BURROW TO 5	TOCKPILE"
		and will amount of
ederation	agneral till ham n	sarly Stockpile also of Almping the material he keel B yone. attrial ecross the owned that ind
Cosame (	34 mile destace) as	od Demoing the natival
ma ste	clapsile just inside to	he kill OB yone.
Beenne	if the transfer of m	attud across the
Zone B	fence and it is as	tined that ind
acimpo	dumps would have	e diliente mil
this ma	neuver without cross	sing the boundary.
9,00		
Se	eral samps will a	se constructed up to
the fine	e line George barrier	) and have roads
constru	eted such that th	e end dumps may
turn as	wied to senter ma	by. Two does will
be reg	used to sentore ma	the to the act of
H. S	- Bar Oc Two PAT ON	it to other parks of D loaders with the
assista	es of a OSL down	will look twelve
un to.	burney enlar. No more	Esters. Conditioner will
be perfo	med at this time.	all work outside of enformed at level D. I have D Zone
the level	B you will be p	enformed at level D.
Three sy	pothers will be required a	LEVER D Zone
		*

elsewhere. (See 1 Topsoil)

ject <u>Earthud</u>	er Costs	LANDFILL	CONSTRUCTO	∠ Project No	86 6855
D. Howk		d By Tik			
		C DY T			21947
e 3/11/87	Date	3/18/87			2 of 4
;		_			
HAUL	CYCLE	(3/4 mile	e one-wa	, ) Use 4	600 '
	CYCLE	TENER ALL	TANDOM	NIE 180	4 CAPACITY
!		an saland an interior — P. P. P. P. L., an angular in the combined			
			<b>B</b>		•
	500'	3 or	00'	, Soo'	LONDED
	0- 25			25-0	CYCLE
	500'	36	න <i>්</i>	500'	EMPTY
	0-35		mph	\$5-0	Cycus
			6		
	e e		* A.O. W.NOT IA IV T		
	SECTION	LEWGTH	Ave. 3	PEED	TRAVEL TIM
				THE WORD .	LOADED HALL
		-			<b>—</b> ,
	<b>A</b>				.45
· · · · · · ·	В	3000'	25	35 /	1.36 .4
-					
		500	12.5	17.57	.45
	entra de la composição de		e e go i e e gió communica e com una suscenda.		2.26 min 1.6
•				· · · · · · · · · · · · · · · · · · ·	
· · · · · · · · · · · · · · · · · · ·					-
: 	EXAMPLE	CHCULATE	·~		
	<del></del>	سعدد اسد			= .45 min
	500		X. ——	FO WIN	
	500		_5280 fr	go mus	
	500		5280 fr	ye.	
Loan		12.5 eri_	5280 fr	ye.	
LOAD C	Cycle Use	2 CAT	9660 ru 885 4 CY	Can BIMATION BULKET	JOITH J DE
LDAD C	CYCLS USE	2 CAT	9660 in ses 4 cy	Cambiamina Buckst: CT.E.50	1017A 1 D8 W/
LOAD C	CYCLE USE	2 CAT T 966 D U ER PRODUCTI LOADSE DE	9660 PA 885 4 CY 100 - ROO	COMBINATION BULKET!  CY .C 50  TOR FOR MIT	H. D8 W/
LDAD C	CYCLE USE	2 CAT T 966 D U ER PRODUCTI LOADSE DE	9660 PA 885 4 CY 100 - ROO	COMBINATION BULKET!  CY .C 50  TOR FOR MIT	1017A 1 D8 W/
LOAD C	Cycle Use  CAT  Don  A  Use	2 CAT T 966 D U TER PRODUCT LOADER DE E . 2 Mun 1	9660 in 885 4 CY 1000 Factorist pass	COMBINATION BULKET! CY C 50 TOR FOR MIT	H. D& W/ Truck & 5000's additional p
LOAD C	Cycle Use  CAT  Don  A  Use	2 CAT 1966 D USER PRODUCTS LOADER DE 2 MUNITO 12 4 CH BU	9660 M SBS 4 CY IN - ROO PLANOW FOR PLIST PASS	Com BUMPTION BULKETT  CT @ 50  TO FOR ACT  Load Fuctor	H. D& W/ H. D& W/ Proof & 5000' additional p
	Cycle Use  CAT  Don  A  Use	2 CAT T 966 D U TER PRODUCT LOADER DE E. 2 Min 1 18 CH/3.6	9660 IN SES 4 CY IN - ROO RATION FACE PLIST PASS WKET C. 9	COMBINATION BULKET! CY @ 50 TOR FOR MIT T . 4 min for Load fuctor	H. D& W/ Truck & 5000' additional p = 3.6 cy/

	Task No. 2
By D. HAWK Checked By TEK	File No
Date 3/1/87 Date 3/15/8	Sheet of#
TOTAL TRUCK CYCLE TIME	1
ExCHANGE TIME	0.50 minutes
LOAD (2 LOADERS @ LYOEA)	0.90
HAVE	2.26
MANEUVEZ & DUMP	10.70
ROTURN	1.61
Town Current	697 " 40 O 10 %
10THL CYCLE -	5.97 minutes @ 100% ===
Excumuse & Loan = 1.40	MWOTTS WITH 5.97 min cycle
	· · · · · · · · · · · · · · · · · · ·
⇒ W€ NEED 5.97/1	NO = 4.3 TRUCKS USE 5
PRODUCTION BASED	ON 4.3 TRUCKS
The second secon	
and the second of the second o	
ESTIMATE PRODUCTION	· · · · · · · · · · · · · · · · · · ·
D AVY LOAD PEZ CYCLE	e = 18 C4 Loose
	e = 18 C4 Loose
D AVY LOAD PEZ CYCLE LOAD FAITOR	E = 18 CH 2005E = .85
D AVY LOAD PEZ CYCLE LOAD FAITE	e = 18 C4 Loose
D AVY LOAD PEZ CYCLE LOAD FAITE	E = 18 CH 2005E = 185
D AVY LOAD PEZ CYCLE LOAD FAVOR AVY. LOAD = 18 CY	= 18 CH LOSS = .85 * .85 = 15.3 CCY/LOS
AVY LOAD PEZ CYCLE LOAD FACTOR  AVY. LOAD = 18 CY  2) CYCLES PER HOUR =	= 18 CH 2005 = 185 = 185 * .85 = 15.3 CCY/LUMB 60 min/Hz = CYCLUS/5.97 min = 10.0 CM
AVY LOAD PEZ CYCLE LOAD FACTOR  AVY. LOAD = 18 CY  2) CYCLES PER HOUR =	= 18 CH 2005 = 185 = 185 * .85 = 15.3 CCY/LUMB 60 min/Hz = CYCLUS/5.97 min = 10.0 CM
AVY LOAD PEZ CYCLE LOAD FACTOR  AVY. LOAD = 18 CY  2) CYCLES PER HOUR =	= 18 CH LOOSE = .85 * .85 = 15.3 CCY/LOOD 60 min/Hz = CYCLE/5.97 min = 10.0 CM
AVY LOAD PEZ CYCLE LOAD FINITER  AVY. LOAD = 18 CY  2) CYCLES PER HOUR =	= 18 CH LOSS = .85 = .85 = 15.3 CCY/LOND 60 min/Hz = CYCLE/5.97 min = 10.0 CYL = 15.3 CCY = 153 CC LUAD HE HE
AVY LOAD PEZ CYCLE LOAD FINITER  AVY. LOAD = 18 CY  2) CYCLES PER HOUR =	= 18 CH LOSS = .85 = .85 = 15.3 CCY/LOND 60 min/Hz = CYCLE/5.97 min = 10.0 CYL = 15.3 CCY = 153 CC LUAD HE HE
AVY LOAD PEZ CYCLE LOAD FINITER  AVY. LOAD = 18 CY  2) CYCLES PER HOUR =	= 18 CH LOSS = .85 = .85 = 15.3 CCY/LOND 60 min/Hz = CYCLE/5.97 min = 10.0 CYL = 15.3 CCY = 153 CC LUAD HE HE
AVU LOAD PEZ CYCLE LOAD FATTOR  AVU. LOAD = 18 CH  2) CYCLES PER HOUR =  3) HOURLY PRODUCTION RATE  4) HOURLY FLEET PRODUCT	= 18 CH LOSS = .85 = .85 = 15.3 CCY/LOND 60 min/He = CYCLE/5.97 min = 10.0 CM = 15.3 CCY = 10.0 LOSD = 153 CCM HE HE HOW = 44.3 TENCES = 153 CCM = 650 CM
AVU LOAD PEZ CYCLE LOAD FATTOR  AVU. LOAD = 18 CH  2) CYCLES PER HOUR =  3) HOURLY PRODUCTION RATE  4) HOURLY FLEET PRODUCT	= 18 CH LOSS = .85 = .85 = 15.3 CCY/LOND 60 min/He = CYCLE/5.97 min = 10.0 CM = 15.3 CCY = 10.0 LOSD = 153 CCM HE HE HOW = 44.3 TENCES = 153 CCM = 650 CM
AVY LOAD PEZ CYCLE LOAD FACTOR  AVY. LOAD = 18 CY  2) CYCLES TER HOUR =  3) HOURLY PRODUCTION RATE  4) HOURLY FLEET PRODUCT	= 18 CH LOSS = .85 = .85 = 15.3 CCY/LOND 60 min/Hz = CYCLE/5.97 min = 10.0 CM = 15.3 CCY = 10.0 LOSD = 153 CM HE HE HOW = 44.3 TEULES = 153 CM = 650 CM HE HE
AVU LOAD PEZ CYCLE LOAD FINTER  AVU. LOAD = 18 CY  2) CYCLES PER HOUR =  3) HOURLY PRODUCTION RATE  4) HOURLY FLOET PRODUCT  5) CHECK DOSER PRODUCT  5) CHECK DOSER PRODUCT	= 18 CH LOSS = .85 = .85 = 15.3 CCY/LOND 60 min/Hz = CYCLE/5.97 min = 10.0 CM = 15.3 CCY = 10.0 LOND = 153 CM HE HE HOW = 44.3 TENCES = 153 CM = 658 CM HE HE
AVU LOAD PEZ CYCLE LOAD FACTOR  AVU. LOAD = 18 CH  2) CYCLES TER HOUR =  3) HOURLY PRODUCTION RATE  4) HOURLY FLEET PRODUCT	= 18 CH LOSS = .85 = .85 = 15.3 CCY/LOMB 60 min/Hz = CYCLE/5.97 min = 10.0 CM = 15.3 CCY = 10.0 LOND = 153 CM HE HE HOW = 44.3 TENCES = 153 CM = 658 CM HE HE
ANG. LOND FOR CYCLE LOND FORTOR  ANG. LOND = 18 CY  2) CYCLES PER HOUR =  3) HOURLY PRODUCTION RATE  4) HOURLY FLOET PRODUCT  5) CHECK DOWN PRODUCT  6) PAOJUSTED PRODUCT  6) PAOJUSTED PRODUCT  6)	= 18 CH LOOSE = .85 = .85 = 15.3 CCY/LOOD 60 min/Hz = CYCLE/5.97 min = 10.0 CM = 15.3 CCY = 10.0 LOOD = 153 CM HE HE HOW 1200 = .85 = 1070 CLY > 658 CM HZ HA

Waste Pile Select Fill

.,							ct No. <u>8</u>		
	D. How	1 2	Checked By	, TS X		Task	No	2	
						File N	lo	21947	•
te	3/11/87	7	Date 3	118/57		Sheet	4	of	4
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						t			
	Equip	MONT L	1ST AND	Costs		i	-		
		9	4.1 6		<u>a</u>	7723/14	<u>.</u>	# %	<u> </u>
			466 D L				<u>E</u>	246 5	,
			18c 200			12335	; T <sub>:</sub> -	123 3	2000
	! 🔪		om ance b			682		291 33	2
		•	em akus is			228 1226	<del></del>	72.58	, <b>B</b>
	<u> </u>		ours			12-		_ 38 <sup>25</sup>	
	• • •			:	TOTAL	COST	·	\$ 8779	2
					<b>9</b> , <b>2</b> , •			ر براهی سور	March !
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			the or the same of the contraction of the contracti			o en en manuel en la manuel en			
			regional region in a reference of the same and supply that						
	Cosp	TO MAU	. GONOZA	E FILL A	eron 1	Bozeow	no Sre	CRPILE	
· •		·- 🟕	92 /		1				
		· 8:	11 -110	× He	1548 C	er =	7,60	2/00	
		. 8:	11 THE	- He	/548 c	ey =	1,69	2/04.	
		8	/+ <del>-/</del> #e	~ He,	/548 c	ey =	4,59	2/04	
		8:	/+ <del>-/ He</del>	~ He,	/548 C	ey =	7,55	2/64.	
		**************************************	14 - 7 HZ	~ He,	/548 c	ey =	7,69	2/64	
		8	/1 -/ HZ	~ He,	/548 c	ey =	7,69	2/64	
		8	/1 -/ He	~ He,	/548 c	ey =	7,69	2/c4.	
-		8	/1 -/ HZ	~ He,	/548 0	ey =	7,69	2/64	***************************************
-		8	/1 -/ HZ	~ He,	/548 0	ey =	7,69	2/64	
		8	/1 -/ HZ	~ He,	/548 c	ey =	7,69	2/64	
		8	/1 -/ HZ	~ He,	/548 c	ey =	7,69	2/64	
		8	/1 -/ HZ	~ He,	/548 0	ey =	7,69	2/e4	
		8	/1 -/ HZ	~ He,	/548 0	ey =	7,69	2/64	
			/1 -/ HZ	~ He,	/548 0	ey =	7,69	2/64	
		8	/1 -/ HZ	~ He,	/548 0	ey =	7,69	2/e4	
			/1 -/ H2	~ He,	/548 0	ey =	7,6	2/64	
			/1 -/ H2	~ He,	/548 0	ey =	7,69	2/e4	
			/1 -/ H2	* He,	/548 0	ey =	7,6	2/64	

Topsoil for Waste Pile

	W AND PRODUCT				3-18	16 -0 7
AAA :467	10m, es 10 5-605-2	: the present	ont opency to USA	PREPARED BY	1 0 70	CREW REF
RMA .				T. KEL	LEY	
LOCATION	•			CHECKED BY	, ,	1 .
DEHVER	100			D. HAL	2 3/13/87	•
	•	CREW	COMPOSITION	0		
WORK TYPE	WORK SCHEDULE			SECIAL INFORMA	<b>T.O. T. . . . . . . . . . </b>	2 4 (15 D) 4
EXCAVATION/PLACEMENT				SAND DRA		AND PLA
		F	LAI	OR COST		ENT COST
CREW DESCRIP	TION .	NO.	HOURLYS	TOTAL	HOURLY	TOTAL
		IN CREW	RATE (S/HR)	FOR CREW (B/HR)	RATE (S/HR)	FOR CREV
CAT DEL D	OZER	1	1688	1688 .	10637	106 37
CAT 9660 LO	PADER	1	/6 <u>88</u>	168	6110	610
12 CUBIC YARD EN	o dump truck	4	1675	67/2	3.750	14920
CAT D6 DO	ZER	2.	1688	3376	4640	9280
CAT 14G MOTO	or Grader	/	1703	1703	756	7561
10,000 gallon WATE	R TANKER		1702	1709	11902	11902
LABORERS		3	1275	38 28		
END DUMP TRUC	K (STANDBY)				2130	2130
•						
TOTALS	MANHOURS	13	LASOR	207041	EQUIPMENT COST	6254
		CREW P	RODUCTIVITY			
work task	PRODUCTIVITY RATE		ABOR	EQUIPMENT	COMM	ENTS
EKCAVATION	UNIT/HR	MH/UNIT	S/UNIT	8/UNIT		
PLACEMENT	251 CY/HR		1082/N	243/		
SAFETY	251 CY/HR.		1093/1	154/69		o
MATERIALS DELIVERED			<b>J</b>	1020/ey/		
TO STOCKPILE		<b>.</b>		/cy	41 70	
LABORY SAFETY WITHOUT	MATERIALS				+578 - #599/c	104
TOTAL EQUIPMENT,			,		\$ .00.	
MATERIALS, LABOR, SAFETY					"15 30/C	Y
	•	<u> </u>				
						•
i	i i	T		. 1		

DA PORM S419-R, Apr 85



THE PROPERTY	MARTY WAY		<del></del>	A DATE PREPAR							
			<b>^</b>								
		W 645-47 4 4 6-	PREPARED BY		CREW REF NO						
	<del>,</del>			ELLEI							
.0	•			HAWK 3/19/5							
•		COMPOSITION									
WORK SCHEDULE					AND PLACE						
<u> </u>	1	LAR			ent cost						
PTION	NO. MICHMED IN CREW	HOURLY* RATE (G/HR)	TOTAL FOR CREW (SMR)	HOURLY RATE GARD	TOTAL FOR CREW (S/MR)						
T	10			3829	382°						
EQUIPMENT	1.			445	4 45						
	3	78°5	234'5								
		•									
		o			·						
				•							
MANHOURS		LASOR COST	23415	EQUIPMENT COST	386 45						
		· · · · · · · · · · · · · · · · · · ·									
PRODUCTIVITY RATE UNIT/HR	MHVUNIT	S/UNIT	EQUIPMENT S/UNIT	COM	IENTS						
251 CY/HR		1093/14	154/								
		·	· .		•						
·			•								
4											
•	·										
	]				•						
	MANHOURS  PRODUCTIVITY RATE UNIT/MR  251 CY/HR	TO CREW  WORK SCHEDULE  PTION ROAD NO. REQUIRED IN CREW  TO JO  EQUIPMENT J  3  MANHOURE  CREW PRODUCTIVITY RATE INIT/HR MH/UNIT  251 CY/HR	CREW COMPOSITION  WORK SCHEDULE  PHON NO. NO. NO. NO. NO. NO. NO. NO. NO. N	CREW COMPOSITION  WORK SCHEDULE  CREW COMPOSITION  WORK SCHEDULE  FILON  ROAD AND AND AND AND AND AND AND AND AND A	STATE SECONS THE SECONS OF THE						

DA FORM SAIS-R, Apr 85

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	0,
Subject LANDFILL CONSTRUCTION - EARTHWOLK COSTS	Project No. BOCBSSYP
By D. Hawk Checked By T.K	Task No.
By D. Macc Checked By 11 7	File No. <u>- 91947</u>
Date 3/7/87 Date 3/11/87	Sheet of
PLACEMENT OF SAND DRAIN SYSTEMS	
THE WASHED SAND REQUIRED W	LL BE OBTAINED FROM
OFF -SITE, THE MATEUALS WILL BE	oelivered by The
SUPPLIER TO THE LEVEL B LIN	S AND DUMPED PROM
A RAMP ALLOSS TO A SPECIFIED	STOCKALE AREA.
THE STOCKPILE AREA WILL BE	PREPARED USAG
CLEAN GENERAL FILL. IT IS ASS	FOR BEAUS IS IN
THE WASHED SAND WILL BE WA	A THE STOCK N/F
PECOME MIXED WITH FINES II	F BASE \
CARTINATE OF AT THE STOCKET	
A DOZER WILL BE REQUIRED	TO WORK THE
STOCKPILE SO THAT CONTINUAL	DUMPING MAY
OLLUR. ONCE IN THE BASIN, T	HE SAND WILL BE
LOGO ED WITH FEDAT. END LOAD	wes into trucks
AND CARRIED TO THE LANDFILL	WHERE IT WILL
BE DUMPED AND THEN SPECTAL	USING DO ZEES
AND WOTOR GRADERS. COM	
PERFORMED BY SEVERAL PAS	SES WITH A
A WATER TRUCK. SEVERAL	SANTERS WILL
BE REQUIRED IN THIS DIEZA	
AND CHECK GEADES.	
	!
LIGHT TRUKES SUCH AS TEN-	TWENT CUBIC YMO
TANDEMS WILL BE USED FOR MI	NUNG SAND IN
BASIN F BELAUSE THEY WILL	BE RUNWING
OVER LINER WITH DNCY 1-F	sor or curen.
POSSIBLY MAY BULD HAX ROA	05 of GOBEAR
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CREW AND PRODUCTIVITY WORKSHEET For use of this form, see TM 5-800-2: the proponent opency is USACE.  PROJECT  RMA  LOCATION  DENVER CO  CREW COMPOSITION  WORK TYPE SAFETY  PREPARED BY T. KELLEY  CHECKED BY D. HAWK 3/18/87  CREW COMPOSITION  SPECIAL INFORMATION TO PSOIL BORROW TO STOCK PILE  LABOR COST FOR CREW  CREW DESCRIPTION  NO. NO. NO. NO. NO. NO. NO. NO. NO. NO.	CREW REF NO
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	LOAD TIME	-80 M/A ( to
	MANEUVER DUMP	= .60 MM C.K.
	TOTAL CYCLE TIME	591 MIN @ 100% EFE.
ESTIMATE PA	PODUCTION	
D) Est	MATED LOAD = 18 CY	* .70 (LF.) = 12.6 CY/LOAD
2) Cuas	ST DOS HOUSE 60 Min	1 CYCLES = 10.1 CYCLES
6) 6100	He	5.91 min = 10.1 CYCLES &
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3) House	M UNIT PRODUCTION = 1	2.6 BCY x 10.1 CYCUES = /27 BCY HZ HT
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12 Ap.iu	STED PRODUCTION (50)	MINUTE HOUR NON-HAZARONS)
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ubject LANDFILL CONSTRUCTION - EARTHWORK COTS	Project No. 86 C8554
D. Hawk Checked By TEK	Task No
	File No. 21947
ate 3/10/87 Date 3/12/87	Sheet <u>\$</u> of <u>3</u>
EQUIPMENT LIST & COSTS	:
	1,2,189 = 1,7049
1) 8 CAT GOT B SCRAPERS C	$134\frac{10}{3} = 1078\frac{40}{3}$ $63\frac{28}{3} = 63\frac{29}{3}$
3) 1 CAT 677 B SCEROVES (STEWDEY) @	75 22 = 150 24
1) 8 CAT 627 B SCRAPERS C 2) / CAT D6 DOZER Q 3) 2 CAT 627 B SCRAPERS (STANDER) Q 4) 1 LABORER (SPOTTER) Q	1276 = 1226
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CAT 627B SCR	APER (STANDBY)	/			75 <sup>37</sup>	75 37
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Waste Pile Sumps and Piping

Project: Name: Basin F	
Location: RMA	
Quote #: 18-1 (Estimate Sht. No)	
Firm: Hame: See below	
Location:	
Telephone No.1 ( )	
Person Talked To:	•
Type of Quote: Supplier, material only (FOB Point:	_)
Subcontractor, material installed (Cost to Prime)	

# Scope/Description/Amount of Quote:

Our cost estimate was based upon an independent calculation of the manhours required to install these materials added to the manufacturing cost, and upon telephone estimates from the three leading companies in manufacture/installation of HDDR geomembrance. All costs were based upon installation of synthetic materials under summer conditions and in level B personal protective gear. The cost tatimates de not include: construction field and office engineering; independent quality assurance engineering; preparation of subgrade 'cut-and-fill, compaction, removal of rocks larger than 1/2-inch); site dewatering; pump station for leachate/leak removal. We also assume that our conceptual design (with a minimum number of penetrations of liner) will be implemented. The estimates are displayed in the accompanying table.

ITEM	ESTIMATED COST (\$/LAYER/SF)	ESTIMATED BY	INSTALLATION COMMENTS	
1. 60-mil HDPE Geomembrane	\$0.74 - \$0.75 e0.e0 \$0.88	HDR Gundle Matienal forl Schlegel	Level B PPG	use obl.
2. 16 os. PP Geotextile	\$0.24 \$0.22	Sublegol National Seal	<b>*</b>	use 0 <sup>25</sup> /.
3. Urainage Net (Geonet)  Date Quote Received:	\$0.32 \$0.26	Nutional Seal Gundle	*	use o <sup>35</sup>
_	Sprague_	•		

# FM. INSTALLATION COST ESTIMATE

ASSUME:

Supplied Air Protective Clothing 20,000 eq. ft./day

LABOR CLASSIFICATION	DAYS	SALARY	RENTAL	PER DIEM	MOBILIZATION PERSONNEL EQUIP	MEN	SAFETY EQUIPMENT	DIRECT + FEE	SALARY + PROFIT	TOTAL
Supervisor (1)	4	\$5,497	<b>\$</b>	\$2,287	\$1,200	9	\$3.430	\$7,609	\$6,322	\$13,931
Head Welder (1)		\$4,398	0\$	\$2,287	\$1,200	<b>0</b> \$	\$3,430	\$7,609	\$5,058	\$12,667
Welders (2)	9	\$7,916	0\$	\$4,574	\$2,400		\$6,861	\$15,218	\$9,104	\$24,322
Technicians (3)	137	\$9,895	0\$	\$6,861	\$3,600	9	\$10,291	\$22,827	\$11,380	\$34,207
Qual. Contr. (1)	46	\$5,277	<b>S</b>	\$2,287	\$1,200	<b>9</b>	\$3,438	\$7,609	\$6,069	\$13,678
Laborers (12)	549	\$35,676	0\$	3	<b>9</b>	<b>8</b>	\$41,164	\$45,281	\$41,027	\$86,308
Operators (1)	46	2	<b>\$</b>	<b>S</b>	<b>%</b>	<b>9</b>	\$3,430	\$3,773	0\$	\$3,773
F. M. Loader (1)	46	<b>3</b>	\$22,869	<b>3</b>	<b>0</b> \$	\$1,000	<b>9</b>	\$26,256	0\$	\$26,256

\$ 0.235 per sq. ft. labor \$ 0.220 per sq. ft. material \$ 0.180 per sq. ft. profit and overhead

\$215,142

\$78,960

\$72,044 \$136,182

\$1,000

\$9,600

\$18,296

\$22,869

\$68,659

1001

SUBTOTAL = \$ 0.635 per sq. ft. \$ 0.739 incl. contingency

USE 4088/SF WARH MALUBES SUB OF P BUT NOT CONTRACTOR OF P

\$ 1.12 OSP \$ 090 /SF W/ OSP Liquid Removal System

CONSTRUCTION COST	ESTIMA'	TE		DATE PREPARED	7 <sup>.</sup>		SHEET	/ e	. /
PROJECT DM 1	۰	*		<u>ر ، د</u>	BASIS FO	R ESTIM	ATE	A STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STA	
RMA LOCATION				ø	1		(No doord		e(ed)
DENVEZ, CO ARCHITECT ENGINEER  WCC/HDR	· · · · · · · · · · · · · · · · · · ·				↓ ¯⊏	) CODE C	(Final de	elen)	
WCC/HDR									DENGN
DRAWING NO.			D. HA	WK		CHECKE	Ton	nKel	Q.
LANDEILL SUMPS SUMMARY	THAUP			LABOR		MATERIA		(	TOTAL
PIPING SUMMARY	MO. UMITS	MEAR	PER	TOTAL	PER UNIT	70	TAL		COST
PIPING									
6" PVC	2/00	FT	144	B 18, 144 00	55	11,6	67600)	2	9,820° 808°
16" PVC	105	FT	357	B 22/9 10	3390	355	5950	5	808 60
				4 1.0	* *2		20 /		
GRAVEL	6	eу	_	B* 3468	100	61	20 /		9583 V
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B INDICATES LEVEL	B 4	72A	D-	USE 6× LA	BOL	ATE			
8* INDICATES LEVE	B	MA	20 -	SAFETY IN	CLUDA	>			

- Sewer and Miscellaneous Debris Removal . Haul Waste to Solidification

CONSTRUCTION COST	ESTIMA	TE		DATI	E PREPARED E 187	+	SHEET	0 F
PROJECT						BASIS F	OR ESTIMATE	***************************************
BASIN F				· · · · · · · · · · · · · · · · · · ·		} c	] cook A (No doo)	gr completed)
LOCATION  RMA Denver ARCHITECT ENGINEER	-						00E B (Prolummery COOE E (Final de	•
	•						THER (Small) 60	
HDE		RETW	ATOR				CHECKED BY	
·		<b>B</b>	). A.	Kot	tuitz			PICKSOU
Sitework www.	QUANT	T		LA		ļ	MATERIAL	Egwiement
Civil SUMMARY	NG. UNITS	UNIT	PER	10	TOTAL	PER	TOTAL	COST
Water				1			·	
Top Exist 2" Line	2	EA	100	В	120	31.00	60	
Pipe PVC Class 160 2°	3/5	LF	1.76	B	3,226	0.32	101	
Backflow Preventer that 2"	2	EA	26.00	B	312	120	840	
Manhob 4'ID x 6' Dags	2	EA	52.00	B	624	320	640	20 - 4
Manhole Top 8" TAL	2	EA	52.00	B	624	82	164	Z9 - 4
Manhole Covere 24 0 30016	2	EA	48.00	B	576	115	230	18.60 - 3
Screened Stone Bedding For	2	27	3.72	B	45	16.00	32	0.40 -
Manholos Compoded 74"- 2"		<u> </u>	ļ					
Execution for Manheles	41	Cr	0.86	B	212		_	1.21 - 5
Using Bookhoe 1 Crap.								
Back Cill by hand Vib. Plate	9	CY	5.22	В	282		_	0.45
Compaction 6" Lifts				Ŀ				
Trench - Excavation 600	p 315	LF	0.24	В	454		-	0.30 -
-Bedling	6	CY	2.68	В	96	5,cc	30	C.27 -
-Back fill Au To-	29	CY	3.47	B	600		_	0.78 - =
Sub+0+01					7,274		2,097	Z'
					7.175			
Process Forcemain	•				edant in			
Pipe - PVC Containment 6"	1,600	LF	-	made	oded in erial total	<i>85,0</i> 0	136,000	Quote #5
Valves - PVC Ball 4"		EA	18.49	8		2 <i>88.</i> %	288	
- Diaphreom - Noo-		EA	160.00	В	960	1.180	1,100	" + 7
provo Lined 6.								
Pipe Suparte: Total of 160							•	
Pipe Clamps Galv. 10"	160	FA	3.45		3,312	19.43		
Galv. Threoded Rod 1/2"	640	LF	1.28	8	4.9/6	0.38	243	
Conevete	83	۲ع			- 9'		42254,174	
Forms - 4 uses	4,480	SFCA			37088	0.85	3.808	0.22 - 76
Concrete Placement	<i>8</i> 3	۲ع	4.96			0.31		2.31 - 20
Subtotal				14	18,857		149,743	101

"B" Designates Level B. Labor multiplied by factor of 6.

CONSTRUCTION COST	ESTIMA	TE		DATE	3/87			SHEET	OF
TOBLONG	<del></del>				<del></del>	BASIS F	OR ESTIM	IĄTE	
BASIN F			·				_	-	gn completed
RMA DONNER						. –		reimmery : (Final do	=
ARCHITECT ENGINEER	•					<b>1</b>	THER (Sp	-47)	On Dacin
HDR			ATOR				CHECKS	Day	
Pump Station	QUANT		P. A. A				MATERIA		CKSON
Structural SUMMARY	NG. UNITS	UNIT	4	0	797AL	PER	T	TAL	Equipmer COST
Concrete (Div. 3)	•							•	
Slabs on Grade:									
Concrete - 4000 psi	11	CY			_	54.20		596	
Placino	11	cy	7.45	B	492			-	0.46 -
WWF- 6×6 #4/4	5.95	CSF	13.10	T	468	20.20		120	•
Edge Forms	136	LF	1.04	T T	849	0.16		22	0.05 -
Screed - 2×4	14	LF	0.69	B	58	0.79		11	0.04 -
Finishing (Broom Finish)	595	SF	0.23	B	821			-	0.04 -
Curino (Spraved Membrano)	5.95	CSF	2.7/	B	97	1.70		10	
Equipment Pade:					<u> </u>				
Concrete - 4000 psi	1	Cr				54.20		54	-
WWF - 6×6 4/4	0.48	CSF	13.16	B	38	20.20		10	_
Placing	1	CY	7.45	B	45			-	1.46 -
Forms	50	LF	1.09	B	312	0.16		8	0.05 -
Finishina (Float Finish)	48	SF	0.22	B	63				c. c4 -
Curing (Sprayed Membrons)	0.48	CSF	2.71	B	8	1.70			_
Anchor Bolts & 0 x 12"	8	EA		B	99	2.20		18	•
4"Ø×6"	. 12	EA			131,43	0.64		Э	_
				-				858	<u>.</u>
					3.493 3481				
Metals (Div 5)									
Guardrails - Steel	145	LF	2.84		247	21.00		305	
- Painting	14.5	LF	0.50		44	0.50		7	
· - Anchor Bolts 4	20	EA	2.06		<i>2</i> 47	1.88		35	
-Bolt Capout & Drilling		EA	6.30		756	0.05			
, ,					1,294			35/	
1) "B" Designates Le	vel B.	Lak	or Mu	Hip	lied by	facto	- of	6.	
-					7				

CONSTRUCTION COST	ESTIMA"	TE	`	DATE	187		SHEET	95			
PROJECT					, , , , ,	BASIS FOR ESTIMATE					
BASINI F							] COOK A (No door #				
LOCATION	•					_	006 8 (Proliminary d				
RMA DONIONAL ARCHITECT ENGINEER							] 690£ C (Final dec	(m) 07 Days			
HOR							THER (Specifi)	)/3 Desig			
		ESTIM	ATOR	· - · ·	lan .		AC ERIC	KSON			
Pumo Station	THAUP		<u> </u>		OR (M. H.)		MATERIAL				
Mechanical SUMMARY	NG. UNITS	UNIT	PER		TOTAL	PER	TOTAL	TATAL			
Process	<b>J</b>			100	······································						
Air Supolu Sustem		-									
Air Compressor =330 scfm	/	EA	21.0	8	144,0	17.300	17.500	Quate =			
@ 125 ,7519											
Air Receiver - 120 and	/	EA	2.0	8	12.0	842	842	Quate =			
Air Pisino (- Steel 2"	75	LE	0.15	8	157.5	2.13	160	a			
Hospid 2 - Steel 3/4"	8	LF	0.10	B	4.8	0.67	5	protein and a second			
Prossure Reducin Value 2"	1	EA	0.70	B	4.2	260	260				
Ball Values 1- Steel K"	1	EA	0.40	g	2.4	5.05	5				
- Steel 3/4	/	EA		1	2.4	3.03	3				
throught - Steel 1"	2	عرتے	p.50	3	6.0	10.44	21				
- Steel 2"	. /	7	3.2	8	19.2	27.84	34 30				
Pipe Supports - Conc. Black	7	=A	1.0	E	42.0	1.47	9				
- Piza Clanas	7	EA		E	13.9	1.32					
Air Pains Filling FE" Elbous	11	EA	0.33	ī	<i>হ</i> ন্ত.7	4.61	5/	•			
1-2" Unique	4	1	0.94	i	22.6	10.40	42				
1-2"x1" Red.	2	1	0.76		9.1	3.52	1				
/ - 1" Elbours			0.68	i	3.2	1.53	3				
threadad. < -2"Tees	1	EA			8.7	6.25					
- /*Unions	. 2	ΞA.	i	1	85	4.91					
- JUFFer Com	2	EA			6.7	23,00					
- 3/4" Union	1		0.65	4		235					
	3	ZΑ			11.0	1.25	1				
-3/4" Elbius			n.42		5.0	19.30	38				
Pressure Relief Valve 3/4"	2	EM	11.76	<u> </u>		7.37	19.362	<u></u>			
Subtotal				<u> </u>	460.8	}	17, 366				
•		·									
-					•						
				<u>.</u>	•						
1) "B" Designates L	evel E	. ۷	abor	4.54	liplied a	y Fa	ctor of 6	,			
				,				مستجودات وحسوسان			

CONSTRUCTION COST	ESTIMA"	TE		DATE	/27		SH	EET	0.5
PROJECT						BASIS FO	OR ESTIMATE		
BASIN F							] cooe 4 (No	<b></b>	n <del>ampl</del> eted
PME Davie	•						306 0 (Prolem ] 6906 6 (PH	-	_
ARCHITECT ENGINEER	o	·· <u>-</u>							0% Desi
HDR		ESTIM					CHECKED B		
Pumo Station			A. K	6++	wite				ICKSON
41.1	THAUP	177		LAB	9R	<del></del>	MATERIAL		TOTAL
Process	NG. UMITS	UNIT	PER	0	TOTAL (MH)	PER	TOTAL		COST
Fluid Punoina System								۰	
Disphraom Pumps - 150gp	. 2	EA	3.2	B	33.4	8.338	16,6	76	Qual- #
@ 150 FT TOH(P.1018210)									
Flex. Connections "Nonoroue.3"	4	EA	1.5	B	36.0	25900	1,0	36	
Quick Couplings -Sin. SH. 4"	Z	EA	1.6	E	19.2	330.00	6	60	٠
Flex Suct. Hase W/Str. Stl.	10	E4	1.5	8	90.0	530.45	53	05	Quate *
Orich Coupline Ends - 4" 10×20°	,								
Pipe - PVC Sicht &"	12	1=	0.33		23.8	3.60		43	
File Contourat 6º	20	LF	-	Inclu 1-4	idea in mar!	<i>E5,0</i> 0	1. 7	00	೦ ಲಕ್ಕ್ =
Pall Values - PVC = 2014"	2	EA	0.92	3	11.0	288.00	5	7/2	Section and the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of th
Diaginam Walvar Negrone	/	EA	7.92	R	ح.5	1.100	1.10	00	Quote=
Lined & Newmon District Flo	kood								12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 may 12 ma
Pine Susant: Total of 2									
Pro Clamas 10"	2	54	0,119	E		19.43		≥0	Same opiny married in the same
Golv. Threshed Rod B	$\varepsilon$	25	0.06	2	2.9	0.33		3	
Consiste	1.04	=7				50.70		<u>53</u>	
Forms - 1 .35e	56	SECA	0.30	B	100.3	1.82	/	02	# Imludes Epuis, Cos
Community Placing	1.04	CY	0.43	B	2.7	*0.49			* Equipment
5.64.421	•				374.2		27.2	94	
ELECTRICAL									
REPUCH TO COMP DAD	1500	F							15,677
LIGHTING TO COMP. PAD									7,842
LAROR							<u></u>	•	
<u>_</u>	600	LIS	13.76	87	56				8256
•	<u></u>								
								$\bot$	
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(1) "B" Designates Leve	1 B.	400	or M	JH;	lied b	الم وعر	tor of c	6	-
					1				45 × 13 MA

Project: Name: BASIN F
Location: DENVER
Quote #: / (Estimate Sht. No)
Firm: Name: INGERSOLL - RAND
Location: OMAHA .
Telephone No.: ( 402 ) 330-5831
Person Talked To: STEVE ZIMMERLE
Type of Quote: K Supplier, material only (FOB Point: DENVER)
Subcontractor, material installed (Gost to Prime)
Scope/Description/Amount of Quote:
MODEL SSR EP 75  W/ Reduced voltage starting  Protective shutdown annuciator  TEFC motor  Dust inlet  electrical 4604 3\$\rightarrow\$ 60HZ  330 cfm Free Air Delivery @ 125 psig  \$17,800 ea
Weight = 2350 16
- 2330 13
•
•
·
Date Quote Received: 1/19/87

Project: Name: Basin F
Location: RMA Denver
Quote #: Z (Estimate Sht. No. / )
Firm: Name: CPI Sales
Location: Omeha
Telephone No.: ( 402 ) 334-73/7
Person Talked To: Bred Baustend
Type of Quote: X Supplier, material only (FOB Point: Denver )
Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
Air Operated Diaphragm Pumps
Wilden Model M-15
Accessories & Options:
Non Wetted Parts: Cost Iron
Ball Valves: Neoprene
Value Seats: Neoprene
Diophraams: Nesprene
Oiler
مران المرازية مرازية
Regulator
Polypropylene Surge Supressor
TOTAL COST FOB = \$4,165
Weight = 215 16 each
Date Quote Received: 1-19-87
Quote Received By: FURNE

Project: Name: RASIN F
Location: DENVEC
Quote #: 4 (Estimate Sht. No)
Firm: Name: Ranger Rubber
Location: Omaha, NE
Telephone No.: (402) 55/-2300
Person Talked To: John
Type of Quote: X Supplier, material only (FOB Point:
Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
A" Suction Hose w/ Str. Stl. quick couplings
All chemical type hase
20 ft lengths
Male * Female Couplings
\$ 530 45 each
•

Quote Received: 3-17-87

Quote Received By: D Ko Hwitz

Project: Name: BAS	IN F
Location: D	ENVER
Quote #:	Istimate Sht. No)
Firm: Name: Gartner	É Assoc. Co. Inc.
Location: Omok	, NE
Telephone No.: (	402) 572-6969
Person Talked To:	Rene Nelson
Type of Quote: X Supp	plier, material only (FOB Point: Denver
. Land	contractor, material installed (Cost to Prime)
Scope/Description/Amount	t of Quote:  Operation of control to the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the prope
	PROPOSAL-
Tr.	9 NDR INFRASTRUCTURE HAME OF 108 : Nerve Agent disposal Denver Co.
Per phone conversation	8404 Indian Hills Drive Cmaha, Re. 68114-4049
3-19-87, determined	Actn: Thomas Furne
that \$65 /FT is	Tou, confirming our phone convergetion today is a list of same of the specifics for the SAF-T-GAID piping system. I will send additional additional information as I receive. Thank you for your time and consideration. I will be in teach shortly.
price including	SAF-T-GARD CONTAINMENT PIPING SYSTEM:
mstallation excluding pipe supports.	5° sch40 PVC carrier pipe - selvent welded 10° sch40 PVC containment pipe- PVC welded 2° polyverthame feases in place insulation 14° final system size with a finished PVC outer casing, common stack couplings
•	PLY TUTTE:
	The piping system shall be electrically heat tape traced. The heat tape and an aluminum wrap to prevent het spets will be installed in a camainum annor around the containment pipe before the insulation is feased in place. The electrical connection point will be a Mid Feed System reaching out 1000 feet on either side. Thermostat(s) included. <u>Voltage and breaker.</u> size to be clairfied. Next tape to be designed for amnions tammerature of 20°F and to maintain fluid at 50°, entering piping system at 53°.
	MISTALANIONS MATTERIAL
	Lank detection — sumps with sight glans, drain valve. Spacing as required. Expansion joints—flamped neopreme type. As required. Elbows and two or "I" fittings -factory fabricated.PVC ball valves Carrier pips supports -internal to the piping system Baffles internal to the piping system
	PIPING SISTEM SUPPORTS:
¢	To be field erected by others (Concrete podistals. "V" straps)
•	Sections price to include neterial, freight to job site, field service instructions
Date Quote Received:	2-20-87
Date Quote Received:Quote Received By:	FURNE

Project: Name: BASIN F  Location: RMA Denver  Quote #: 6 (Estimate Sht. No)
Firm: Name: INGEROLL - RAND
Location: OMAHA, NEBRASKA
Telephone No.: (402) 330-583/
Person Talked To: Steve Eimmerk
Type of Quote: X Supplier, material only (FOB Point: Denver
Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
Model VCG2412 Air Receiver 120 gal Coast Guard Approved Epoxy Coated  \$342 FOB Denver Weight -

Date Quote Received: 3-17-87

Quote Received By: D.A. Kottuitz

Project: Name: BASIN F
Location: DENVEL
Quote #: 7 :(Estimate Sht. No)
Firm: Hame: Central States Industrial Supply, Inc.
Location: Omaha, NE
Telephone No.: (402) 344-8900
Person Talked To: Keill
Type of Quote: X Supplier, material only (FOB Point: Denver  Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
6" Sounders Straight Thru Diaphragm Value
with neoprene lining and neoprene diaphragm.
Weight = 250 16.
\$1100 FOB Denver
•
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•
•
•
Date Quote Received: 3-18-87
Quote Received By: DA. Kottwitz

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- Sewer and Miscellaneous Debris Removal (Compaction in Waste Pile)
- Haul Waste to Waste Pile (Compaction in Waste Pile)

CR	EW AND PRODUCT	IVITY WO	RKCHEET		I DATE PREPAR	: E
	is form, see TM 5-800-2			ICE.	3-18-	
PROJECT				D. HAWK		CREW REF NO
DENVER,	Co.	•		CHECKED BY	3-12-87	
		CREW	COMPOSITION		/	*
WORK TYPE	WORK SCHEDULE			SPECIAL INFORMA	TION SLUDGE	HANDLING
EXCAVATION HAULING				BASIN F TO		
		1	LAI	OR COST	EQUIPME	NT COST
CREW DESCRI	PTION .	NO. REQUIRED IN CREW	HOURLY* RATE (8/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (8/HR)
CAT 627 B Sca	APERS	4	1703	6812	117 77	47108
CAT DEL D		2	1680	3376	106.37	212 24
CAT DG DO	25 <i>E</i>	1	1688	1688	465	46 40
CAT 14 9 MO	TOR GRADER	1.	1703	1703	756!	7561
MRS 1-1005 T	RACTOR W/DISC	1	1688	1688	83 <sup>2</sup>	8329
LABORERS.		2	12 76	25 52		
CAT 627 B Scen	ARERS (STANDBY)	1			75 37	75 <sup>37</sup>
·						
					·	
·						
TOTALS	MANHOURS	11	LABOR	178 19	EQUIPMENT COST	964 29
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	S/UNIT	EQUIPMENT \$/UNIT	COMME	NTS
EXCAVATION HAULING	404 CY/HR		"044/cy	4 2 39/cy		•
SAFET.Y	404 c//42		40 29/cy	4 0 86/cy		•
<u>.</u>						
TOTAL EQUIPMENT, LABOR & SAMETY	·				> #40	8/cy
	•					
Including fringe benefits						

DA FORM \$419-R, Apr 85

	EW AND PRODUCT is form, see TM 5-800-2			CE.	DATE PREPAR	-87
PROJECT RMA	·			D. HAL	μK	CREW REF NO
LOCATION DENVER	., Co	•		CHECKED BY	3-18-67	
	·	CREW	COMPOSITION			
WORK TYPE SAFETY	WORK SCHEDULE			BAS N F	TO SOLIDIF	HANDLING
		NO.	LA	OR COST	EQUIPM	ENT COST
CREW DESCRI	PTION .	REQUIRED IN CREW	HOURLY* RATE (S/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)
HEAVY Equip	≥M€N4_	9 -	<del></del>		3820	343 80 445
STANDBY HEAVE	4 Equipment	1			4.45	445
LABORERS		2	78°5	15612		
		·	-			
			•			
·						
TOTALS	MANHOURS		LABOR COST	15610	EQUIPMENT COST	34825
		CREW PR	ODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	S/UNIT	EQUIPMENT \$/UNIT	СОММ	ENTS
SAFETY	404 CY/42		*032/cy	086/cy		•
						•
	_					
					······································	
* including fringe benefits						
DA FORM 5419-R, Apr 85						أسير سينية والتبطيب

Subj	ect Landfill construc	tion - Sh	dge , eroval costs.	Project No. <u>86 C 8554 P</u>
			D. HAWK	Task No. Z
O y				File No. 21947
Date	3/16/87	Date	3/13/87	Sheet/ of
				TO SOLIDIFICATION
-	This work excavating to solidification	will income final area.	lude mixing and o grade and hould	rying sludge, to the
	T.+ is execuate ma load scrapers execuate belo will be used F to the so it was assumed sludge could 20% whereas haul roads the haul. I	envision terial of s. Add, TW the to ha did if ca inned to the porti have s other	med that Dozers  youn to liner g  tional dozers  liner to the fini ul excavated must tion area wathe  hey'd be more m  ions of the excavation of the  resistance  youts of the  in law rolling resistance  in stance of 109	will be used to rade and to push will be used to shed grade. Somewas from Busing than trucks as mobile. It was avation area and les as high as 15960 haul would be on esistance. Thus, an lowest assumed for
	and disc attended to the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state	achment d being ussumed	t and a light de used for main that 2 laborers	g and drying of the ly with a tractor deer. A motor grade taining the haul roads would be used as
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ite 3/16/87	Date	3/18/87	Sheet Z of	5
REQUIRED PRO	DUCTION:			
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TE	<b>k</b>	Checked B	y D. HAWK	Task No. 2
				File No. 21947
3/	16/87	Date	3/18/87	Sheet _3 of _5
	:			
STI	NATED CY	CLE TIMES		:
	LIAO)	PROFILE (CAT	- 627R SCRAPE	R) FROM BOTTOMOF
				EA . ASSUME PROFILE
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	A	300′	10% 0.39	1090 0.32
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		300'	10% 0.39	/090 <u>0.32</u>
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		RETURN		2.02
_		LOAD		0.8 /
		MAHUEV	ER AND DUMP	0.8
				6.42 min/cycle @ 10
			<u>a and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second and a second an</u>	
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Subject Landfill Cons By TEK	struction-Sludge.  Checked By		S Project No. <u>S6C6554P</u> Task No. <u>Z</u> File No. <u>2194</u> =
Date 3/16/87	Date 3/18/	/87	Sheet 4 of 5
ESTIMATED P	RODUCTION		gaga ang pangganan ang ang ang ang ang ang ang ang
DESTIM	ATED LOAD	ASSUMED	LOAD FACTOR)
	7	;	= 14.4bcy/LOAD
2) CYC!	ES PER HOUR (60 min/	(fr.) (1cycle 6.42m	n.) = 19.34 cycles/hour.
3) ADS	USTED HOURLY C	INIT PRODU	CTIOIN (45min/Artorlev-18
	(45 min) 9.3	Acycles/hr.)	(14.4bcy/LOAD) = 100.5cx
4) NEE	383 bcy/hr.		
	$\frac{3}{10}$	83ky/hr.	= 3.80 /
		·	use 4 scrapers
5) CHECK	PUSH DO ZER		4(0.8) +0.25 = 1.37minu
	SCRAPEIZ DOZER C	$\frac{\text{CYCLE}}{\text{CYCLE}} = \frac{6.4}{1.3}$	7 min = 4.69.
	50 USE 1. E	07. <u>4350</u>	HANDLE 4 SCRAPERS
6) ELEET		1 1	FICIENCY (45 min/hr)
		4 × 1029	cy/hr. = 403.6cy/hr. ~
		and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	

By T€ k  Date 3/16/€ =	Checked By D. HAWK  Date 3/18/87	Task No
<b>4 4 4 1 7</b>	CAT D-BL DOZERS  CAT 627B SCRAPER  (STANDBY)  CAT 14G MOTOR GRAD  CAT D-6 DOZER & & & & & & & & & & & & & & & & & & &	$\frac{329}{\sqrt{59997}} = \frac{53^{25}}{\sqrt{59997}} = \frac{59997}{\sqrt{514248}} = \frac{52552}{\sqrt{514248}}$
	# 1,1.42 4B/HR =	2 Sey

Haul Waste to Waste Pile

CRE	EW AND PRODUCT	IVITY WO	RKSHEET		DATE PREPAR	EC
For use of thi	s form, see TM 5-800-2				3-18-	87
PROJECT RMA				PREPARED BY D. HALL	J.K.	CREW REF NO
DENVER,	Co.	•		CHECKED BY T. Kelle	y 3.18-87	1.
		CREW	COMPOSITION		,	
WORK TYPE  GRADMY /COMPACTING	WORK SCHEDULE			BPECIAL INFORMA		
7			LAI	IOR COST		ENT COST
GREW DESCRI	PTION .	NO. REQUIRED IN CREW	HOURLY* RATE (8/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (\$/HR)	TOTAL FOR CREW (S/HR)
CAT 825 C C	OMPACTOR	,	1680	1688	9052	905
CAT DOL T		1	1688	1688	106.37	10637
<u> </u>			•			
			•			
•						
			·			
TOTALS	MANHOURS	2	LABOR COST	33 7k	EQUIPMENT COST	1.96 89
		CREW PI	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	ABOR S/UNIT	EQUIPMENT S/UNIT	COMM	ENTS
GRADING/COMPACTION	383 CY/HR		*0°9/e4	*0 <sup>51</sup> /cy		·
SAFETY.				4020/cy		•
<del> </del>						
TOTAL EQUIPMENTS						
LABOR SAFETY					- *08	<sup>2</sup> /c4
	-					•
*Including frings bandles						

C	REW AND PRODUCT	TIVITY WO	RKSHEET		DATE PREPAR	ES
	this form, see TM 5-800-	2: the propon	ent apency is USA		1 3-18-1	37
PROJECT	•			PREPARED BY		CREW REF NO
RMA				D. HAL	NK	1
LOCATION DEN VER	Co	D. HAL		1		
DENVER	<del>, co.</del>			Trella	y 3.18.87	<u> </u>
	•	CREW	COMPOSITION			
WORK TYPE	WORK SCHEDULE			SPECIAL INFORM	ATION	
SAFETY			<del>,</del>			
ł		NO.	LAI	OR COST	EQUIPM	ENT COST
CREW DESC	REQUIRED IN CREW		FOR CREW (S/HR)	HOURLY RATE (S/HR)	FOR CREW (S/HR)	
HEAVY EquiP	MENT	2			38 20	76 40.
			·		<del>                                     </del>	
·						
TOTALS	MANHOURS		LABOR COST		EQUIPMENT COST	7640
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	ABOR S/UNIT	EQUIPMENT \$/UNIT	COMMENTS	
SAFETY	383 c/4R			*02º/cy		۰
						•
*Including fringe bonefits					·	

DA FORM \$419-R. Am #5

	ect <u>Jandf</u> TEK		Checked	/_	Hank	<i>[</i> '	Task N	o. <u>2</u> . <u>219</u>	47
Date	3/17/8=	<del>7</del>	Date	3/18/	, 37		Sheet_	/	of 2
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Subject Landie Costo - La	indfill g	aling and Comp	Exproject No. <u>860</u>	:8554P
BY TEK	Checked By	D. Howk	Task No	
		_	File No. <u>2194</u>	
)ate 3/17/87	Date	3/18/87	Sheet	_ of
REGUIRED PRO	SOUCTION	<del>,                                    </del>		· · · · · · · · · · · · · · · · · · ·
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h	ourly prodo=	: 525 c.y. /hr. (	383 Dey/hr.	)
5	raper eye	525 c.y. /hr. ( cle = 1483 min., 15 craper every	@ 1009 efficie	ency
***************************************	Scrapers	1scraper every	1.71min +	
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(From	CAT Reform	Performance; 3pd	tion = 1293 VC	13/hr. 13/
	H	landbook) production		
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				2 30- JHR-
COST	45 /			
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	y thr.			
\$ 230	5/hr.	#0.60 /bcy		
	bcy/bc	Mody	<del>~   </del>	<del>                                     </del>
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Note: NO	Satery _	considerations cost except 45	token into acc	ious.
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Solidification

	W AND PRODUCT			· · · · · · · · · · · · · · · · · · ·	DATE PREPAR	
PROJECT	form, see TM 5-800-2	the propon	ent apency is USA	CE. PREPARED BY	13-18-8	TICREN REF NO
RMA				D. HAWK	•	CAER REF NO
LOCATION	LOCATION DENVER, CO.					
DENVER,	<u>Co.</u>	- CDEW	COMPOSITION	TINE	1104 3 18-87	1
WORK TYPE	WORK SCHEDULE		COMPOSITION	SPECIAL INFORMA	TION SLUNGE	مامرين ماد
EXCAVATION HAULING				SOLIDIFKATIN		
			LAB	OR COST		NT COST
CREW DESCRIP	TION .	NO. REQUIRED IN CREW	RATE (S/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (\$/HR)	TOTAL FOR CREW (S/HR)
CAT 627 B Sc	RAPERS	4	1703	6812	11722	471 08
CAT DEL DOE	ers .	. 1	1688	16 88	106 37	106 37
CAT 966D LO	ADERS	Z	1688	3376	6119	106 37
Laborers	•	2	12 26	25 <sup>52</sup>		
CAT 6273 SCRAP	ers (Standby)	1	<b>Opportunity</b>	9	75 37	7537
						S TAMBET
,						- A Barriera and A
·						
TOTALS	MANHOURS	9	LASOR COST	144 28	EQUIPMENT COST	7.7502
		CREW P	RODUCTIVITY			
WORK TASK	PRODUCTIVITY RATE UNIT/HR	MH/UNIT	S/UNIT	EQUIPMENT S/UNIT	COMM	ENTS
EXCLUATION / HAULING	383 cy/42		# 0 38/cy	12°2/cy		·
SAFETY.	383 CY/HE		*041/cy	*021/ey		
					•	
Total Equipment with Labor & Safety					> *3º	/cy
	•					
* Including fringe benefits						

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Ca	EW AND PRODUCT	MATY WO	5 4 5 1 5 5 T		DATE PREPARE	, No. 2, e
	is form, see TM 5-800-2	CONTRACTOR	HRSHEET			
PROJECT		c. the prepon	ent epency is USA	PREPARED BY	1 3-18-	87
RMA				_		CREW REF NO
100171011		· · · · · · · · · · · · · · · · · · ·		D. HAW	K	
LOCATION DEN VER	$C_{\alpha}$	•		CHECKED BY	2 10 07	
DEN VER	<del>,</del>			1. Kelle	3-18-87	•
	•	CREW	COMPOSITION			
WORK TYPE	WORK SCHEDULE			SPECIAL INFORMA	TION SULVE	HANDLING
SAFETY				SOLIDIFICATION		
			LAS	OR COST		NT COST
1		NO.	HOURLY.	T		
CREW DESCR	iPTION "	MEQUINED	RATE	TOTAL FOR CREW	HOURLY	TOTAL FOR CREW
		IN CREW	(S/HR)	(S/HR)	(S/HR)	(S/HA)
<b></b>					ļi	and the same
HEAVY EQUIPM	GIT	17			3820	11740
meaty Equit.	16/0 1	-			70	2674 <u>0</u> 44 <u>5</u>
STANDBY HEAV	L FOURMANT		· <u></u>	<u>.</u>	445	1,45
DIANUS HEAT	7 LYVIPPIENT				4-	4
1400000		2	7805	15610		
LABORERS			10	136		
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TOTALS	MANHOURE		LASOR	15610	EQUIPMENT	27/85
			COST	156	COST	211
		CREW =	RODUCTIVITY	<del></del>		
			<u> </u>			
WORK TASK	PRODUCTIVITY		ABOR	EQUIPMENT		
	UNIT/HR	MH/UNIT	\$/UNIT	S/UNIT	COMMI	ENTS
<b>.</b>	383 CY/HR	1	8 41/	B 71/		
· SAFETY	303 /HR		OH/CY	021/4	: •	
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*Including fringe benefits	· · · · · · · · · · · · · · · · · · ·			1		
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Task No. 2 File No. 21947	Subject <u>faschill Cos</u>	ts -socidi	ficution to fo	<u>andfill</u> Project	No. 86C3554
SLUDGE HAULING -SOLIDIFICATION AREA TO LANDFILL  This work will include loading material from the sold  sludge stockpik at the Rg mill into scrapers and haulin and dumping it inthe landfill.  It is assumed that loaders will be used to top load  scrapers. Scrapers will then haul the material to the land fill and dump it. A D-2 Dozer will assist the loaders  zlobour will be used as spotters  Daily production of the fleet should roughly match the autput of the pug mill.	V			Task N	lo
SLUDGE HAULING -SOLIDIFICATION AREA TO LANDFILL  This work will include loading material from the solid sludge stockpik at the Pig mill into Scrapers and hauling and dumping it inthe landfill.  It is assumed that loaders will be used to top low scrapers. Scrapers will then haul the material to the land fill and fill and dump it. A D-D Dozer will assist the loaders alobour will be used as spotters  Daily production of the fleet should roughly match the output of the pug mill.	YICK				
SLUDGE HAULING -SOLIDIFICATION AREA TO LANDFILL  This work will include loading material from the solid sludge stockpik at the Pig mill into Scrapers and hauling and dumping it inthe landfill.  It is assumed that loaders will be used to top low scrapers. Scrapers will then haul the material to the land fill and fill and dump it. A D-D Dozer will assist the loaders alobour will be used as spotters  Daily production of the fleet should roughly match the output of the pug mill.	ate 3/16/87	Date	3/18/87	Sheet.	of4
This work will include loading material from the sold sludge stockpik at the Rymill into Scrapers and havling and dumping it in the land fill.  It is assumed that loaders will be used to top low Scrapers. Scrapers will then have the material to the land fill and dump it. A D-2 Dozer will assist the loaders above will be used as spotters  Daily production of the fleet should roughly match the output of the pug mill.					
sludge stockpik at the Rymill into Scrapers and havling and dumping it in the landfill.  It is assumed that loaders will be used to top loan Screyers. Scrapers will then have the material to the land fill and dump it. A D-2 Dozer will assist the loaders allowers will be used as spotters  Daily production of the fleet should roughly match the autput of the pug mill.	SLUDGE HAULING	J -SOLIDIF	ICATION AREA	TO LANDE	icl_
sludge stockpik at the Remill into Scrapers and havling and dumping it in the landfill.  It is assumed that loaders will be used to top loan Scrapers. Scrapers will then have the material to the land fill and dump it. A D-2 Dozer will assist the loaders allowers will be used as spotters.  Daily production of the fleet should roughly match the autput of the pug mill.	-/ /	. ( ) /.	-b /- 1:	. 1 1 6	
sludge stockpik at the Remill into Scrapers and havling and dumping it in the landfill.  It is assumed that loaders will be used to top loan Scrapers. Scrapers will then have the material to the land fill and dump it. A D-2 Dozer will assist the loaders allowers will be used as spotters.  Daily production of the fleet should roughly match the autput of the pug mill.	1his work	will incl	se loading	material tr	rom The Solain
It is assumed that loaders will be used to top low Screwers. Scrapers will then haul the material to the land fill and owns it. A D-& Dozer will assist the loaders above will be used as spotters  Daily production of the fleet should roughly match the output of the pug mill.	sludge stocksil	e at the	Rumill in	6 Scrapers	s and hauling
It is assumed that loaders will be used to top low Screwers. Scrapers will then haul the material to the land fill and owns it. A D-& Dozer will assist the loaders above will be used as spotters  Daily production of the fleet should roughly match the output of the pug mill.	and dumping	it int	the / land fill		/
match the output of the pug mill.		, //	4 1 6- 1		-//////////////////////////////////////
match the output of the pug mill.	1+ 15 955	omed the	ill then by	will be use	to top loud
match the output of the pug mill.	land filland	dumo it.	A D-8 POZ	er will assi	st the loaders.
match the output of the pug mill.	2 laborers will	be used o	s spotters		
	Daily pr	oduction	of the fl	'est shou	ld roughly
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		and the second second			
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by 'C'		4	File No. 21947
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			= 167.4 cy/hr/h
4)	NEED 525 CY/hr.		
5)	<del>الكاناتات</del> عرب السيبسم <del>ان ساند نا ساسا</del>	4 cy/hr Junit	cse 4 scrapers V
		$\frac{yc/e}{c/e} = \frac{4.83}{1.8}$	min = 2.68 screpers  nin Loaders for 4 screpers
6) FLE	4× 167.4	Level B effic Y/hr./un.+ =	669.6 CY/hr.
	(5	Wood	dward-Clyde Consultants

Diplot and Costs - Substitute to the State  TEK  Checked By D. Hawk  Task No. 2  File No. 2/347  Sheet 4 of 4  CAT 6278 Scrupers @ \$134 90 = \$539 90 /  1 Cat 6278 Scrupers @ \$134 90 = \$539 90 /  1 Cat 6278 Scrupers @ \$134 90 = \$539 90 /  2 Cat 9600 Foodian \$637 90 = \$155 90 /  1 Cat 0-50 Dozer \$2/23 90 = \$155 90 /  2 Cat 9600 Foodian \$637 90 = \$123 25 /  2 Cat 0-50 Dozer \$2/23 90 = \$123 25 /  2 Cat 0-50 Dozer \$2/23 90 = \$193 20 /  TOTAL HOURLY \$5919 30 /   COST PER CY.  * (\$919 30 /hr)/(383 ky/hr) = \$240 /kcy V USS THIS PRICE BASED BCY BROWN, THIS WILL IN A 24 ADD THIS SILLING IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 ADD THIS WILL IN A 24 AD	7'			
TOTAL HOURLY  Les 3/16/87  Date 3/18/87  Sheet 4 of 4  A CAT 627B Scrupers @ 1/34 30 = #53920 V  1 Cat 627B Scrupers (5tadby) @ #7537 = #7537 V  2 Cat 966D Pooller @ #7235 = #15526 V  1 Cat 0-8 Dozer @ #12325 = #12325 V  2 Satorera @ #1276 = #2552 V  TOTAL HOURLY #91930 V  (*91930/hr.) (525 CY/hr.) = #175/C.Y. V  (*91930/hr.) (383 ky/hr) = #240/bcy Ves this PRICE 8480 BC4 EXRAVA;  THIS WILL IM  AC ADDITION  SOLIDIFICATION  MATERIAL (NO.	<b>l</b> ·	Checked I	BU D. HAWK	Task No.
4. CAT 627B Scrupers @ \$134\frac{30}{20} = \$539\frac{20}{20} \\ 1. Cat 627B Scrupers @ \$134\frac{30}{20} = \$75\frac{37}{20} \\ 2. Cat 966D footler \$677\frac{32}{20} = \$75\frac{32}{20} \\ 1. Cat 0-8 Dozer \$6\$12\frac{32}{20} = \$12\frac{32}{20} \\ 2. Satorera \$6\$12\frac{32}{20} = \$12\frac{32}{20} \\ TOTAL HOURLY \$5919\frac{30}{hr.} \\ \left( \frac{4}{9}\frac{19\frac{30}{hr.}} \right) \left( \frac{52}{52} \cup \frac{1}{hr.} \right) = \frac{\$\frac{1}{20}}{20} \left( \frac{1}{hr.} \right) \\ \frac{130}{4} \left( \frac{1}{hr.} \right) \left( \frac{32}{30} \right) \right) = \frac{\$\frac{1}{20}}{20} \left( \frac{1}{hr.} \right) \\ \frac{20}{4} \left( \frac{1}{4} \right) \left( \frac{1}{4} \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \right( \frac{1}{4} \right) \right) \\ \frac{1}{4} \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \right( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \right) \left( \frac{1}{4} \right) \right) \right) \left( \frac{1}{4} \right) \right) \right) \left( \frac{1}{4} \right) \right) \right) \left( \frac{1}{4} \right) \right) \right) \right) \left( \frac{1}{4} \right) \right) \right) \right\right\right\right) \right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\				
4. CAT 627B Scrupers @ \$134\frac{30}{20} = \$539\frac{20}{20} \\ 1. Cat 627B Scrupers @ \$134\frac{30}{20} = \$75\frac{37}{20} \\ 2. Cat 966D footler \$677\frac{32}{20} = \$75\frac{32}{20} \\ 1. Cat 0-8 Dozer \$6\$12\frac{32}{20} = \$12\frac{32}{20} \\ 2. Satorera \$6\$12\frac{32}{20} = \$12\frac{32}{20} \\ TOTAL HOURLY \$5919\frac{30}{hr.} \\ \left( \frac{4}{9}\frac{19\frac{30}{hr.}} \right) \left( \frac{52}{52} \cup \frac{1}{hr.} \right) = \frac{\$\frac{1}{20}}{20} \left( \frac{1}{hr.} \right) \\ \frac{130}{4} \left( \frac{1}{hr.} \right) \left( \frac{32}{30} \right) \right) = \frac{\$\frac{1}{20}}{20} \left( \frac{1}{hr.} \right) \\ \frac{20}{4} \left( \frac{1}{4} \right) \left( \frac{1}{4} \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \right( \frac{1}{4} \right) \right) \\ \frac{1}{4} \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \right( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \left( \frac{1}{4} \right) \right) \right) \left( \frac{1}{4} \right) \right) \right) \left( \frac{1}{4} \right) \right) \right) \left( \frac{1}{4} \right) \right) \right) \left( \frac{1}{4} \right) \right) \right) \right) \left( \frac{1}{4} \right) \right) \right) \right\right\right\right) \right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\right\	nte 3/16/87	Date	3/18/87	Sheet $\underline{\mathcal{A}}$ of $\underline{\mathcal{A}}$
COST PER CY.  1 (91930/hr.) / (383 ky/hr) = \$250 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg = \$750 / kg				
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TOTAL HOURIN \$91930 / $\frac{\cos \tau}{(491930/hr.)}(525 \text{ CY/hr.}) = $175/c.y.  Use this price based BCY BXEAUATTH'S WILL IM 10% 400 1700 SOLIO IDICATION MATBRIAL (NO.$	4.0	T 627B S	crupers @ 134	\$53920
TOTAL HOURIN \$91930 / $\frac{\cos \tau}{(491930/hr.)}(525 \text{ CY/hr.}) = $175/c.y.  Use this price based BCY BXEAUATTH'S WILL IM 10% 400 1700 SOLIO IDICATION MATBRIAL (NO.$		t 62+6 se	isoper (Stardby)@-	875272 #75 V
TOTAL HOURIN \$91930 / $\frac{\cos \tau}{(491930/hr.)}(525 \text{ CY/hr.}) = $175/c.y.  Use this price based BCY BXEAUATTH'S WILL IM 10% 400 1700 SOLIO IDICATION MATBRIAL (NO.$	/ Ca1	7 7000 700 t D-8 De	9860 €\$12325	= #12325/
TOTAL HOURIN \$91930 / $\frac{\cos \tau}{(491930/hr.)}(525 \text{ CY/hr.}) = $175/c.y.  Use this price based BCY BXEAUATTH'S WILL IM 10% 400 1700 SOLIO IDICATION MATBRIAL (NO.$	2 La	borers	G \$12 36	= \$ 2552/
$\frac{\cos \pi  \rho_{er}  c_{Y}}{(\#919^{30}/hr.)} \left(525^{c_{Y}/hr.}\right) = \#1^{35}/c_{Y}.V$ $\#(\#919^{30}/hr.)/(383^{b_{Y}/hr}) = \#2^{40}/b_{c_{Y}} V \text{ Use this } PRICE 8480 BC4 BC4 BC4 BC4 ADDITION SOLDIFICATION MATBRIAL (NO.$				0.039
# (#91930/hr.) (525 CY/hr.) = # 175/C.Y. V # (491930/hr.) / (383 ky/hr) = # 240/bcy VES THIS PRICE BASED BCY EXCENDATION 5040 FICHTION MATERIAL (NO.			TOTAL HOURLY	70/17 = V
# (#91930/hr.) (525 CY/hr.) = # 175/C.Y. V # (491930/hr.) / (383 ky/hr) = # 240/bcy VES THIS PRICE BASED BCY EXCENDATION 5040 FICHTION MATERIAL (NO.				
# (#91930/hr.) (525 CY/hr.) = # 175/C.Y. V # (491930/hr.) / (383 ky/hr) = # 240/bcy VES THIS PRICE BASED BCY EXCENDATION 5040 FICHTION MATERIAL (NO.				
# (#91930/hr.) (525 CY/hr.) = # 175/C.Y. V # (491930/hr.) / (383 ky/hr) = # 240/bcy VES THIS PRICE BASED BCY EXCENDATION 5040 FICHTION MATERIAL (NO.				
* (91930/hr.)/(383 ky/hr) = #20/kcy / USE THIS  PRICE BASED  BCY EXCENTION  FOLIOFICATION  MATERIAL (NO.)  **  **  **  **  **  **  **  **  **				
* (91930/hr.)/(383 ky/hr) = #20/kcy / USE THIS  PRICE BASED  BCY EXCENTION  FOLIOFICATION  MATERIAL (NO.)  **  **  **  **  **  **  **  **  **	# ( # a 19 3º	11/00	cu/ \ \$	175/201
*(91930/hr.)/(383 by/hr) = #240/bcy USE THIS PRICE BASED BCY EXCAVATION 10% ADDITION MATERIAL (NO.)	\ ' 7 i ') =	/. In		
BCY BXCAVATON THIS WILL IN NO MAD OF TOO SOLID IFICATION MATBELIAL (NO		Thr. 1 323	1/hr.) =	1 - 7 c.y. D
BCY BXCAVATON THIS WILL IN NO MAD OF TOO SOLID IFICATION MATBELIAL (NO		,		,
THIS WILL IM  10% 400,170  SOLIDIFICATION  MATBRIAL (VO		,		,
10% ADDITION SOLIDIFICATION MATERIAL (NO		,		10 /bcy / USE THIS PRICE 84500
SOLIDIFICATION MATBRIAL (VO		,		D /bcy / USE THIS PRICE BASED BCY EXCRUATION
		,		PRICE BASED BCY EXCAVATOR
# Note: These costs do not include safety considerate costs except for 45/60 % efficiency.		,		PRICE BASED BCY EXCENTAGE THIS WILL IN 10% 400,770
* Note: These costs do not include safety considerate costs except for 45/00% efficiency.		,		PRICE BASED BCY EXCRUATION THIS WILL IN AND ADDITION SOLIDIFICATION
Costs except for 45/60 % efficiency.		,		PRICE BASED BCY EXCRUATION  THIS WILL IN  10% ADDITION  SOLIDIFICATION
	*(*q19 <sup>30</sup> /h	r.)/(383.b	$\frac{cy}{hr} = \frac{22}{2}$	PRICE BASED BCY EXCENTS THIS WILL IM NOW ADDITION SOLIDIFICATION MATERIAL (NO
	*(*q19 <sup>30</sup> /h	r.)/(383.b	$\frac{cy}{hr} = \frac{22}{2}$	PRICE BASED BCY EXCENTS THIS WILL IM NOW ADDITION SOLIDIFICATION MATERIAL (NO
	*(*q19 <sup>30</sup> /h	r.)/(383.b	$\frac{cy}{hr} = \frac{22}{2}$	PRICE BASED BCY EXCENTS THIS WILL IM NOW ADDITION SOLIDIFICATION MATERIAL (NO
	*(*q19 <sup>30</sup> /h	r.)/(383.b	$\frac{cy}{hr} = \frac{22}{2}$	PRICE BASED BCY EXCENTS THIS WILL IM NOW ADDITION SOLIDIFICATION MATERIAL (NO
	*(*q19 <sup>30</sup> /h	r.)/(383.b	$\frac{cy}{hr} = \frac{22}{2}$	PRICE BASED BCY EXCENTS THIS WILL IM NOW ADDITION SOLIDIFICATION MATERIAL (NO
	*(*q19 <sup>30</sup> /h	r.)/(383.b	$\frac{cy}{hr} = \frac{22}{2}$	PRICE BASED BCY EXCENTS THIS WILL IM NOW ADDITION SOLIDIFICATION MATERIAL (NO
	*(*q19 <sup>30</sup> /h	r.)/(383.b	$\frac{cy}{hr} = \frac{22}{2}$	PRICE BASED BCY EXCENTS THIS WILL IM NOW ADDITION SOLIDIFICATION MATERIAL (NO
	*(*q19 <sup>30</sup> /h	r.)/(383.b	$\frac{cy}{hr} = \frac{22}{2}$	PRICE BASED BCY EXCENTS THIS WILL IM NOW ADDITION SOLIDIFICATION MATERIAL (NO
	*(*q19 <sup>30</sup> /h	r.)/(383.b	$\frac{cy}{hr} = \frac{22}{2}$	PRICE BASED BCY EXCENTS THIS WILL IM NOW ADDITION SOLIDIFICATION MATERIAL (NO
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		٠.	<u> </u>	RECEIVED 3/2	28/87	FROM HDR T	ン#
CONSTRUCTION COST	ESTIMA	TE		DATE PREPARES	· · · · · · · · · · · · · · · · · · ·		1 00 /
PROJECT	<del></del>	<del></del>	,	-/2		OR ESTIMATE	/
BASINF - PMA	<del></del> -						gr completed)
Denvæ, Co						OOK & (Profiminary	=
ARCHITECT ENGINEER	•					THER (Specify)	noton) no% Doctora
WCC/HDR LAB	or 6x	ESTI	Level	R	1 /	CHECKED BY	Op Dps, gar
•	-	<u>L.</u>	KOTT	WITZ-GRI	AC HEX	AL ERI	CKSON
Absortion System summary	QU ANT	UNIT	PER	LABOR	<del> </del>	MATERIAL	TOTAL
	UNITS	-		TOTAL	PER	TOTAL	COST
WOOD WALL	<u> </u>						
2x4 Frame	200	KF.	1.68	4.436	0.24	634	5070
t" Plywood	2160	SF	1.26	2722	0.41	886	3608
Na:15	100	16			0.48	48	48
Ersension Anchors	60	Ēa	11.82	710	2.65	159	869
SITEWORK						SUBTOTAL	9595 V
2" PVC Water	255	LF	13.00	3,315	8.33	2,124	5.439 .
Incomming Power	4000	ع		75.202	_	103,550	178.75
Sump Execution	100C	CE	1.98	1,980	0.25	250	2,230
-Conrate	4	CY	437.4	1,750	70	280	2,030
- Formwork	400	SF	23.04	9,216	1.49	596	9,812
ECHIBMENT						SUBTOTAL	
Flu Ash Tonks	2	Ea	24,000	48,000	40,000	1	128,00€
Puo Mills	3	۷5		10,000		96.000	106,000
=H0 23e13	4	Ēa	1.200	4.800	7:00	8,000	12,80C
-Electrical '				5856		565	6,421
20 - Consequer (Full)	240	4=	100	24,000	750	180,000	204,00
Relt Conveyor (Pilot)	120	CF	100	12,000	600	72,000	84,00
- Finetrical				12,700		7.300	20,000
Lighting (Abs + Ponosti)		45		28,098	_	9,004	37,107
Rotary Feeders							3.7.52
- Freders, Motor	(V)	Ea	1,800	5.400	1385	4155	9,555
- VFD 3HP	3	Ea	402	1,206	1538	4,614	5,820
Dust Control System						•	0,000
- Cyclone	1	Ea		5.000		12,000	17,000
- 3 lower	. 1	Ea		1560		2,800	4,360
- Flortrice	1	Ea		400		800	1,200
						SUBTOTAL	636,252
SUBTOTAL PG 1				258,351		585,765	844,116
•	I	- 1					116

ENG PORM 150

CONSTRUCTION COST	ESTIMA	TE		-3/87	,	SHEET	Z Z
FROJECT				·		STAMITES NO	***************************************
BASIN F-RMA				···		] cook & (Me deer,	gn esompleted)
DENVEZ, CO						DOS & (Preliminary	
WCC/HOR	•					THER (Specify)	60% Dela
DRAWING NO.		ESTI	ROTAL			CHECKED BY	10 45,9
•		K	TWI	TZ - GRACI	HEK	ALERI	CKSONS
ABSORPTION AREA SUMMARY	THAUP			LABOR		MATERIAL	
	NO. UNITS	WEAR		TOTAL	PER	TOTAL	COST
Ammonia Scrubber System						·	
-Sembber		Ea	ļ	10.000		15,000	25,00
- ALMOS, Aloine		Ea		30880	<u> </u>	31,174	62,05
- Blower	1	Ea		1560	<u> </u>	4,500	6,06
- Electrical		Ea		400		800	1,200
OPERATIONS						SUBTOTAL	94315
Chemirels							
- Ely Ach	40,000	<u> </u>			25.70	1, 148,000	1,148,0
- H2 S04	5000	501			0.76	3.800	3,80
= NaC10	400	<u>S</u> 1			0.90	360	360
- NO 0 H	500	Gal	<u> </u>		1.02	510	510
· ·				DEMPNO CHALLE		SUBTOTAL	115267
Flectrical Dower	720,000	_	4700/	28,200	0.06	43,200	71,400
Marsower						SUBTOTAL	71.400
5 Equil Oceators	15600	hrs	17.18	Z68,008			268,00
2 Laborers	6240						85.8
1 Pue Mill coerator	3120	hr:	16.88	52,666			52,6
1 Flu Ash operator	3120	742	16.88	52,666			52,64
Equipment	•					SUBTOTAL	459,20.
4 Loader 130HP	5320	4-			61.10	<i>5</i> 08,352	508,35
1 Dozer HOH?	2 <i>08</i> 0	hrs		·	46.40	96,512	96,51
CAP OUTLAY COST	1	دع				66,000	66,00
Abs. Maint Cost	1	LS				67,500	67.50
CONIC SLAB		<u>LS</u>		329,422	LS	83.816.	4/3,23
SUBTOTAL PG Z	<u>.                                    </u>			859.664		2,069,524	2,929,18
SUBTOTAL PG-1				258,351		1	844,116
TOTAL				1,118,015		2,655,289	3,773.30
	Í	- 1	- 1				

CONSTRUCTION COST I	TAMITZ	F		DAT	2 - 3 8	7	SHEET	1 0 2
בסונסות בטון נוטא בטונים בי	-31100				70	BASIS FO	OR ESTIMATE	····
RMA							] code & (No doorge	
DENVER, CO	•					<u> </u>	DOE 8 (Proliminary di ] COOR C (Final dee)	60% DE
ACCOUNTED THE METER						. <u>.</u> .	THER (Specify)	L FRICK.
WCC/ HDR		EST IM	4700				CHECKED BY	
Draying Mg.			Fu	R	YE			
	QUANTI	77		LA	80R		MATERIAL	TOTAL
SUMMARY	MQ. UMITS	UNIT	PER		707 AL	PER	TOTAL	COST
GROUND SLAB							·	
125'x100' + B" 0.75	12.500	SF	\$0,410	B	34.500	1.44	15 000	52,50
Peter								
= 21'3 - [(84x 125' x 0.668 16/C+) +	5.74	Ton	305	B	10.504	505	2,899	13,40.
(67×100' × 0.669 16/2)								
1=000 16/m = 5.74 T					-			
11/201								
(3' Hiel x/125+100+100 \x 2.57)	24.2	CY	99	В	16375	75	1,315	16,190
1-5 = 24.19 cx				<u> </u>				
		1						
= 5'5 == 5 x 3.5'x 1.04210/02 / 800016	0.59	1-m	230	В	214	505	298	1112
= 44 21225 × 0.44 15/5+ /2000 15	0.33	Ton	230	В	455	505	157	622
					· · · · · · · · · · · · · · · · · · ·			
Emis Paki								
100 x100 x 4"	10.000	55	0.43	3	25 PM	0.71	7.100	32900
lier WWF. 5"x5" #4/1			13.10	3	9.825	20.20	2,525	12,35
charces slab								
125 x 125 x 19/12	15.425	SE	0.49	В	45 932	1.80	28.125	74,06
#414 (= (BH x 125 1 0.1668 14) /2mm	7		305	B	. 12.328	505	3,540	16,36
121					<b>,</b>			
What (125 x 5 x 19/-) /=7 = 19.3	19.3	CY	99	В	11.464	75	1,448	12,9
1/3 x 125 x 0.663 /= 200) +							•	
=125 x 3.5 x 0.664/2000) = 0.54T	0.54	Ton	230	B	745	505	273	1,018
- U134,				Γ				
E. ishing					•			
Finishing (125x125)+(125x100)+(125x100)=	40,625	SF	0.22	B	53,625	1		53,62
	406		2.71	В		1	690	7,29
Curing No. 625/100	1		1	T				
ī	1	1	I	L.,				

CONSTRUCTION COST	ESTIMAT	Έ		DAT	3/87				2 00 2
TROJECT						BASIS FC	A ESTIM	ATE	
RMA						4	,		gample red)
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Denver Co ARCHITECT ENGINEER							C00€ (	(Final dee	(m) 1. Faccus
WCC/HPR						وهر	0%0	sign	1. Earch
DRAWING NO.		EST IM	FUR	. ه	سيرا		CHEGXI	LOV S Y	
•	THAUP		FOR		e sor	1	MATERIA	\ <b>L</b>	
SUMMARY	NO. UNITS	UNIT	P&R TIMU		70744	PER UNIT		TAL	TOTAL
Conc. Curb 125'long	125	LF	3.51	В	2,633	2.90		363	2,996
Footinos amerate	148	CY	28	8	24 3/04	68		10,064	34,928
Reference	6.25				12.375	ì		3,125	15,500
1-25-24									
Forms Edge Footing	900	LF	1.04	E	5/01/0	0.16		144	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon
Factive	800	SFCA	1.27	2	6096	0.31		242	6.344
Walle					,				
2/125×5)+2(125×3)	2500	EF:A	4.07	8	48,840	1.20		2,400	5124
Excavation	940	24	0.27	8	1523	0.63		<u>592</u>	12.115
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		1							2000

Haul Roads (Level B)

CRE	W AND PRODUCT	IVITY WO	RKSHEET		DATE PREPAR	
For use of this	form, see TM 5-800-2:				3/	18/87
PROJECT RMA					ELLEY	CREW REF NO
LOCATION DEHUER	,00	•		D. HAUK	3/12/87	].
	•	CREW	COMPOSITION		<del></del>	
WORK TYPE EXCAVATION / PLACEMENT	WORK SCHEDULE			SPECIAL INFORMA	TION HAUL R	AREAS .
			LAO	OR COST		ENT COST
CREW DESCRIP	TION	NO. REQUIRED IN CREW	HOURLY* RATE (B/HR)	TOTAL FOR CREW (B/HR)	HOURLY RATE (S/HR)	TOTAL FOR GREW (\$/HR)
CAT D-8 E	DOZER	2	1688	3376	10637	212 24.
CAT 966 L	DADER	f	1688	1688	610	610
18 CUBIC TARD END	> DUMPTRUCK	3	1709	5/27	4118	12354
CAT 144 MOTO	R GRADER	١.	1703	1703	7561	7561
LABORERS		2	12 7.6	25 <u>52</u>		
·						
			•	·		
						26
TOTALS	MANHOURS	9	LABOR COST	144 46 -	COST	4.72 99
		CREW P	RODUCTIVITY			
Work Task	PRODUCTIVITY RATE UNIT/HR	L MH/UNIT	ABOR TINULE	EQUIPMENT S/UNIT	COMM	IENTS
EXCAUATION/PLACEMENT	317 ccy/hr.		0 46/cg	149/cy		•
SAFETY	317ccy/hr.		0 49/cy	084/cy	·	•
MATERIALS DELIVEDED TO STOCKPILE				8º5/ey		
TOTAL EQUIPMENT	·				- 4	3 3
MATERIALS, LABOR, SAFETY					<b>-</b> *// <sup>3</sup>	3 <u>3</u> /ccy ~
	·	·				
						•
* including frings paneling						<b>f</b>

DA FORM 6419-R, Apr 86

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	CRI	W AND PRODUC	TIVITY WO	RKSHEET		DATE PREPAR	EΣ
· ·	. use of thi	ferm, see TM 5-800-	2: the presen	ent apancy is USA		3-/	8-87
PROJECT	NA "				PREPARED BY		CREW MEF NO
LOCATION		<del></del>	<del></del>		T. k	CELLEY	] .
	FNVFF	2,00	•		CHECKED BY	× 3/18/87	1
		.,,			J. Horry	<u> 3/18/8/</u>	
			CREW	COMPOSITION	•		
WORK TYPE		WORK SCHEDULE		<del> </del>	SPECIAL INFORMA	TION HOLL	POADS
SAF	ETY				4	EVEL B	AREAS.
i	٠	•		LA	BOR COST	EQUIPMI	NT COST
Cusw	V DESCRIP	TION	NO. REQUIRED IN CREW	HOURLY* RATE (E/HR)	TOTAL FOR CREW (S/HR)	HOURLY RATE (S/HR)	TOTAL FOR CREW (S/HR)
HEAVY EC	301Pr	NENT	7	_	-	3820.	26740
LABORERS			2	7805	15610		
	4,	•		•			
				٠			
	•						
	<del></del>			•			
							·
TOTALS		44.444.04.00		LASOR		SOURNENT I	267 40
***************************************		MANHOURS	COSW 0	COST	1561 <u>°</u> V	COST	2612
				RODUCTIVITY			
work task		PRODUCTIVITY RATE	MH/UNIT	S/UNIT	EQUIPMENT 8/UNIT	COMME	INTS
SAFETY		317 ccy/hr.		*049/cy	* 84/cy		
					70)		
		•					
*Including fringe benefit							
Trings bond?	u		<del> </del>	· · · · · · · · · · · · · · · · · · ·			

Subject End fill Const.	intron-fe	vel Bhaul Kool	DEProject No. 86C 8554 P
BYTEK		D. HAWK	Task No. 2
			File No. <u>2/947</u>
Date 3/17/87	Date	5/18/87	Sheet of
HAUL ROADS	- , 11	ENEL B AREAS	<u> </u>
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level B non	a mainta	uning the sto	Spile in the level
Basea, an	nd haul	ine Jand place	ine the material in
the level B	area.		ying and transporting Spile in the level ing the material in
:1			be constructed up
totle leave	lina (	Rook B bound	and have
roods con	turder)	such that	( ) end dem 05 can dozen will be the name area to
turn and	dump &	eficiently. a	dozen will be
required to	more 1	material from	the name area to
I other works	of the sta	especial A Care	700 lower with the
			load trucks in the
Stock at 10 or or		CEXTIFE IT DURS 90111	in their hard inc
stockpile are			
material an	~ assume material	, where it wi	tance of 1500 ft.
material and dump the	naterial	, where it will be	tance of 1500ft.  1) be spread by a  word as spotters.
material and dump the	naterial	, where it will be	tance of 1500 ft.
material and and dump the D-8 Dozer A motor grad	assume material Two y	average dis , where it will be aborers will be e used to mainta	tance of 1500ft.  1) be spread by a  used as spotters.  in the hall roads.
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Subje	ect Janfill C	onstruct of	- Ked Black	100 Project No. 860 8554 7
	TEK	Checked By	D. HAWK	Task No. 2 File No. 21947
Date	3/17/87	Date	3/18/87	Sheet of
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	MATERIAL COST	TO STOCK	PILE :	
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	SUPPLIER	MAT'L		COST HAULING TOTAL
	BENKMAN - WOODWARD	3/8" max. Pit	size	TON (FOR 10 mile Haci)
	CONSTRUCTION		Gravel	10 mile Hacl)
	· · · · · · · · · · · · · · · · · · ·		1	l l
	COST PER	ccY		
	•		/1 TON 7/12	3/6s ) ZFF3 + 05
		4 -/1011)	2000 lbs / Co	$\frac{3/6s}{4} = \frac{27 + 3}{14d3} = \frac{5}{16} = \frac{5}{16}$
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AND DUMP	DCK PILE	and HAUL	•					
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LOAD								
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- (								
	USE 0.2 mil Dasses For 4 Cy	BUCKET	@ 90°	% EFF. =	: 3,6			
	USE 0.2 mil Dasses For 4 Cy	BUCKET	@ 90°		: 3,6			
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Haul Roads (Level D)

CREW AND PRODUCTIVITY WORKSHEET DATE PREPARED Per use of this form, see TM 5-800-2: the presenent opency is USACE. 3-18-87 PROJECT PREPARED BY CREW REF NO RMA T. KELLEY LOCATION CHECKED BY DENVER, CO D. HAWK 3/10/87 **CREW COMPOSITION** WORK TYPE WORK SCHEDULE PECIAL INFORMATION HAUL ROADS -EXCANAT IOH PLACEMENT LEVEL TO AREAS LABOR COST EQUIPMENT COST NO. TOTAL FOR CREW HOURLY HOURLY MEGLINED IN CREW **CREW DESCRIPTION** TOTAL RATE (E/HR) RATE FOR CREW (S/HA) (S/HA) CHA! 3376 10637. 1688 21274. 2 CAT D-OL DOZER 1688 619 1688 6/10 I 966 LOADER CAT 4118 5127 123 54 1709 3 18 CUBIC YARD END DUMP TRUCK 1703 75<sup>67</sup> 1703 75<sup>61</sup> 14 G MOTOR GRADER CAT 25<sup>52</sup> 1276 2 LABORER 44 46 LASOR TOTALS COUIPMENT MANHOURS COST COST CREW PRODUCTIVITY PRODUCTIVITY LABOR WORK TASK EQUIPMENT RATE COMMENTS MH/UNIT SUNIT SUNIT UNIT/HR 352ccy/hr. 041 EXCAVATION PLACEMENT 352 ccy/hr SAFETY MATERIALS DELIVERED TO STOCKPILE TOTAL EQUIPMENT, MITERIALS, LAROR, SAFETY including frings benefits

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# DRAFT GUIDAULE DOLUMENT FOR PERFORMING EXPEDITED RESPONSE ACTIONS (ERA'S) 11/27/85

#### COST FACTORS AS A PERCENTAGE

l.	Mobilization

- ranges from 2 to 5% of total direct construction costs; use 5% for preliminary estimate

2. Contingency

 ranges from 15 to 25% of total construction cost; use 25% for preliminary estimate

3. Engineering

 ranges from 7 to 15% of total construction cost; use 15% for preliminary estimate

4. Legal and Administration

- ranges from 1 to 5% of total construction cost; use 5% for preliminary estimate

5. Protection Cost Factor

- see Table 1 for different percentage at various protection levels; use most conservative value for preliminary estimate

6. Equipment OaM Costs

- 3 to 5%/yr of equipment cost

7. Insurance Cost

- 1% of total capital cost

8. Equipment Replacement

- 1% per year of capital cost
- 9. Labor Fringe Benefits for O&M Costs
- 20 to 30% of wages
- 10. Start Up and Shake Down Cost
- 5 to 20% of total capital cost; use 20% for complex systems
- 11. Supervision and Administration during Construction
- 8% of estimated project cost -
- 12. Engineering and Design during Construction
- 15% of.estimated project cost

13. Change Order Contingency

- 15% of construction cost
- 14. Non-component costs associated with a site where an onsite treatment facility will be built from "scratch" (applied to total construction costs).
  - site preparation piping electrical instrumentation

- 1-10%
- 8-15%
- 5-12%
- 3-10%

PEF: DRUFT GUIDANCE DOCUMENT FOR

TERFORMUL EXPEDITED RESPONSE

ACTIONS (ERA'S) 11/27/85

## AVERAGE PERCENT INCREASE FOR TOTAL COSTS AT FOUR DEGREE-OF-HAZARD LEVELS\*

This Socretion	level I	Lovel C	Level 8	Level A
Sprince Water Controls:				
1. Surface Seeling - Sychetic Managemen	2146	1192	1225	1241
L. Surface Seeling - Clay	1091	7191	1242	1272
1. Surface Seeling - Angheit	-	-	-	·
i. Surface Sealing - Fly Ash	-	-	-	400
S. Squeqqtation	<b>!178</b>	1242	1268	1285
i. Cantour Grading	1225	1338	1402	1463
. Surface water Blueralan Structures	1358	7448	1512	1548
L. Besins and Fonds	1252	1385	1458	1501
L. Bikes and Serms	1991	1731	1765	1861
Fraund Water Controls:	•			
l. Well feint System	1182	1175	1213	1282
2. Sees will System	-	-	44	9-9
3. Brain System	1287	1381	1432	. 14 <b>8</b> \$
i. jajection System	-	-		•••
S. Sentantte Slurry Trench	1092	1142	1323	1362
l. Grout Curtain	<b>60</b>	<del>-</del> .	-	•••
7. Sheet P11 Ing Cutoff	-	<b></b>		<b>65</b>
L. Grout Botton Sealing	•	-	40	
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L. Active Gas Extraction Systems	-	-		
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l. Treatment of Contaminated Water L. Oran Processing	1198	1212	1751	3175
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E. Transfermer Processing	1952	2938	4175	3412

• Values given include 100 percent for base construction costs.

This unit operation was deemed appropriate for performance only at Level C. Coss at Levels D, B, and A were not provided.

Source: "Worker Health and Safety Considerations: Cost of Remedial Actions at Uncontrolled Hazardous Waste Sites", Draft Final Report, 1983. SCS Engineers for US EPA, Covington, KY

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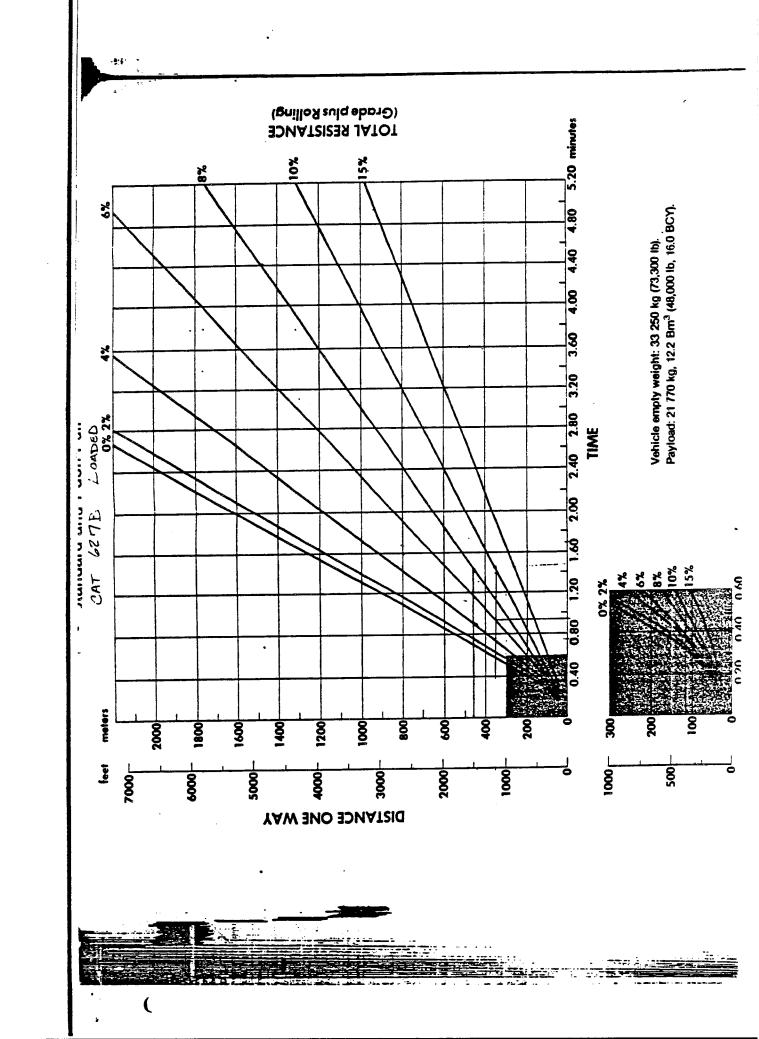
R MA   DENVER , CO   ESTIMATOR   T. Ke   13 / 12   D. Hawk   T. Ke   13 / 12   D. Hawk   D. Hawk   T. Ke   13 / 12   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk   D. Hawk	CONSTRUCTION For use of this form, see	COST ES	TIMATE W	ORKSHEET	DATE PREPAR 3-/8		SHEET 2	<b>o</b> F 2
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-CAT 14G	MOTOR CARNDER:			·				
- Authoritics - Black Control - 882 105   1515 00 8 11   175   - 14' width   .882 105   385 00 2 00 0 45   - 70TAL   5476 2055 1703   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25   C25		.884	1.05	83/000	4459	1865		
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- TOTAL 5476 2055 1703 C25  LOADER: -CAT 966C .891 105 7490° 40° 20° 10° 10° 10° 10° 10° 10° 10° 10° 10° 1			<del>                                     </del>			<u> </u>		
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Subject WAGE RATES FOR RMA Project No. 86 C 8554 P			8554 P	
By D. Hawk	Checked By T. Kell		ask No.	
Date 2/12/87	Date 6/7,6/87	•	ile No/ heet/	
WAGE RATES F	DR COST BSTIMATTING			
REF: GENERAL	WAUE DELISION NO.	C086-	• 1	
TZS,	LOCATED IN ADAMS CO RG7W IS IN SECTION 2G	OUNTY, C	OLORADO	
PAILITE	RICIANS - AREA I ES - AREA I ER - GROUP 1 7 2			
0.52	Equiment - Zone 1 Delvers - Zone 2			
· ·				
Conscory	Work Dascerption	WAGE	FEINGE	Torac
) ELETRICIANS	ELECTRICIANS CARLE SPLICES	16.85	2.10+3.3% 2.10+3.3%	
2) CARPONTERS	Au	13.90	3.22	17.12
3) CEMOUT MASONS	ALL	12.40	3.79	_ 16.19
4) Ieruweum	Acc	16.00	<i>3.</i> 53	ويان فحجو ومداريات
5) LABORISES	@ Flackbers  Of Minimum Labor  Frence Exectors	10.22 3.55	2.24 2.24	1275
	Seeding State Chase Tie Ban i Charis in Concrete pouling,  Concrete pouling,	10.57	224	12.31
	Jack hommers, form solves concrete sons, esphalt leader	,		
	pipelaner, condit, pump specialist			· · · · · · · · · · · · · · · · · · ·

Subj	ect WAGE RATE	S FOR RMA		Project No. 80	C8554P
By	D. HAWK	Checked By T K.J.		Task No	2
				File No. 2	947
Date	2/12/87	Date 6/06/95	2	Sheet	_of3
				<u> </u>	
	CATEGORY	WORK DESCRIPTION	WAGE	Fruce	TOTAL
	-	a e			
6	Pawer Equipment	O Air Compression,	12.41	3.77	16.18
	Cherafors	Mechanic, Welder			
Ĭ		Light plants, Single anit conveyor			
		Pumps, Trector	•		
		under 70 HP			•
1		4 360 CPM Compressor	1		
		@ Conveyor , building	12.76	3.77	16.53
ļ		materials, trenches	•		
	• •	Pigmilly self-propoled	•		
		roller, nubber Hired			
		under 5 tons	<b>.</b>		
ļ	•	3 Apple of Plant	: 13.11	317	16.88
		Concrete batching			
1	•	Finish Machines Paving, Hoist Idrum,	•		
		Hydraulic backhoes	, ;		
		under 34 or, Loader			
	•	= 6 cm , Motor gred	4		
	e e e e e e e e e e e e e e e e e e e	(rough), rollers over		**	يوري شايد
	•	5 1626, 70 HP JOHN			
İ		tractor			2
1	•	(4) Grane and backing	s = 13.24	- 3.77	17.03
-		5 Cy and under	<b></b>	•	
	Andrews & Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial Commercial C	Hydrulic Hoe 3/4 cy			1
7		over Ger Median	<b>.</b>		•
		Finish motor grader	;		
مال		Multiple Unit Croshe	i .		<u>-</u> 1
		Scrapes & 40 cy			
		Welder		• • • • • • • • • • • • • • • • • • •	
-		(5) Heavy-duty meckens		3.77	17.18
		wilder, Scraper >			; ·
		40.04			÷
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Subject WAGE RATES FOR RMA Project No. 86 C85547 T. Kelly 6/26/87 By D. HAWK Checked By File No. 21947 Date 2/12/37 Date

CATEGORY U	lock Description	WAGE	FRINCE	TOTAL
1) TRUCK DELVORS C	PICK-UP, TRUCK DRIVER TENORES,	12.88	3.64	16.52
<b>3</b>	Dumpmen, Gerneres Truck Driver = 604	13.01	3.64	16.65
<b>3</b>	Shottle truck, single extended tanker of the liquid tanker of tanker arte, mechanics	13.14	3.64	16.78
<b>@</b>	tenders, sump 670 Mey Straddle Truck, Lumber	13-21	3.64	16.85
	Carrier Fork Lift, Fuel Truck Cement Miner to 10 CY	13.74 13.33	3.64 3.64	16.90 16.97
	Multi-purpose ; Haist Dump truck > Mey	13.38 13.45	3.64 364	17.02 17.09
	but < Flor, semi liquid tenter, buk			
	Toxch diver, som plow	13.58	364	17.22
<b>©</b>	Comment when 10 to 1504 Demp track up to 39cy	13.74	3.64 3.64	17.28
	Tire man, dump truck	14.0L	3.64	17.45
<b>(F)</b>	Cerest Mixer > 15 CY	14.13	3.64 3.64	17.77
<u> </u>	Heavy Duty diesal	15.51	3.64	11.15
<b></b>	welders Highboy, Lowboy, Somi	15.76	364	19.40
				TOTAL TO SERVE MEMBERS AND AND AND AND AND AND AND AND AND AND
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Subject HEALTH AND SAF	ETY COSTS	Project No. S	16C8554P
		Task No	_2
	By T. KELLEY	File No.	21947
Date 3/17/87 Date	3/18/87		of
Diana Maria	La Same Par		
DIRECT HEALTH AN		\ <u>_</u>	
D CAT 627 B	SCRAPGE & OPERA	IDE CHEAVY	EQUIPMENT)
. <b>.</b>	sed CAB (RANGE 24	, '	25º/mo
b) A.c.	Conditioner	2 /	50 mo
a) Air C	ulinders 9/5/204		85 /mo
d) Prote	ylinders 15/244 extire Clother Term	400 30	1850 mo
c) Dess	DERON 2 hr/day C	1703/	75 /mo
£) 14 St	and by personal 2017	2 Jun = 1	1950 mo
4, 1, 0,	and by Operator @17	Y	
	TOTAL MON		6015/mo.
		,,,,,,,	
•	**** * * * * * * * ********************		
One tim	e costs		
			40
a) Bu	ackets for cylind	ers = 3	500 ee
b) A.	rline System.		400 00
c) Cox	imunication Jystom	(Light) = &	200.
a) Fi	nst Aid Rit	•	52 25 25 25
e) Fi	re Extinguisher		40 <del>થ્ય</del>
t) Le	vel B training	m/ = 1	500 <u>e</u>
g) th	ysical (2) & 450	The = =	900
•			51500
	101 A	L 1-71MG = \$3 15 6 MO = \$2	(05)
e e e e e e e e e e e e e e e e e e e		E DMO - 2	77/70.
	A Carlo Maria	en en en en en en en en en en en en en e	
TOTAL MI	DATHLY COST CA	T 627 B Sper	y = "(4610 °
Assume	173 He /mo T	orac HOURLY COS	T= 2820/4
+ Average cab cost	used for this	cost 2507	605 = 425
<i>0</i>	المناط فحيل المتعدد فالموادي	2	-
Scrapers @	low end 240	"/ea- 627B	- •
Dozbrs O A	low end 240 igh and 60	1500/ea- D8	
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and the specimen control of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of th	1		
NOTE: USE 6 WORLDAYS	VEEK AND 30 CA	LENDAR DAY M	JUTH .

Subject	EALTH ?	JAFETY CO	STS	· · · · · · · · · · · · · · · · · · ·	Project No	<u>84 C 8554 P</u>
By D H	Low K	Checked By	TKILL	E	Task No	
<b>b</b> , — .		Checked by	, ,, ,,	,	File No.	21947
Date 3/17	1/87	Date 3	118197	•	Sheet	2of
7	wann Ha	مه کو نور مو		. /	د درد عصب	7.0 00.40
	TELECH TIE	ALTH? SAN	-217 70	e with	-5/65 /W M	IK PACES
	N Face	1	1341 8	- 00 20	3	Par v c
		LABOREZ 1 5 MINUT				
		REPS WILL				
		MON PEZ				
•	FOR	- 30 min	utes on	- 30 min	utes off	- 15 mi
		K 70 AND				
		1460UF\$ 0				
		IMED.	. •			.,
	Da	ILLY CHARLE	<b>"</b>			_
		a) Promerin	VE CLOTH	es 43 <sup>ee</sup>	=	43 0 /OM
may 1 2 mm 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	_	b) 5 China	eours (	16-	8	BOE/DAY
		c) 1.5 LAR.	eors e	12 76/HZ =	Bitle =	15312 DAY
	(	c) 1.5 LAZO	clothas -	for	., =	1845/DAY
		extra la	choreis	1.5(1230	<b>9</b> .	-70 /
	. (	e) SCBA Re f) Dress /o.	efill Z.	5×7/5 (015		22 047
		f) Deess 10	و چ	2 × SHE = 15	THE =	63 80/DAY
			10	THE DANK	y =	\$ 546 92/Day
	•		1.			
	CHE	TIME CHAR	ues 16	,	_	
		a) Levez B	TRAMING	1500 × 2.5		37.50 00
	• • •	D) Commun			100:23	250 ee
		c) SCBA d) Russez	2.34 /30	200 - 3		3/30
		e) PHYSICAL	3 2 0	KOD EN X X	5 2	22.50 eg
		eg 1,445.01c	~ ~ ~ ~ .			_2230
				TOTAL OR	6 T/M6=	10.050
i		1		ASSUME	6 MO =	41675/mo.
	1					1
	<b></b>				<del> </del>	
		THE HOURS	4 COSTS	<b>.</b>		<u>.</u>
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<del></del>	<del> </del>	546	/8 +	16/3/173	- 178	3 - /4R
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Subje	ect HEALTH KADS	AFETY COSS - STANDBY	EQUIPMENT Project No. 86C8554P
Ву	T. KELLEY	Checked By D Hawk	Task No. 2
-,		_	File No
Date	3/18/87	Date 3/18/87	Sheet/ of/
	LIOU OPEN AT	WALL LEALTH AUD	DATES COST FOR STANDON
	1402 - OF ERAT	CHAL PLACE TIME	SAFETY COST FOR STAND BY EQUIPMENT
	Dom	G RENTAL .	
	• • • • • •	a) Enclosed Cab (Ran	qe 240 = -605 /mo) = \$425 =/mo
		b) Air Conditioner	= \$150° /mo
		To	TAL MONTHLY \$575 /ma
		<del>-</del>	
	2) ONE TIM		
	-) ONE III	_	
		a) Brackets For (	Cylinders \$500°
		b) Airline System  C) Communication	n # 400 € System (Light) # 200 ° €
	·	d) First Aid Kit	¥ 25 °°
		a) Fire Extinguishe	# 40 =
	and the second second	7	OTAL 1-Time \$ 1,16500
		A	SSUME FOR 6 MO. \$ 1940/mo
	To	OTAL MONTHLY STANDE	by equipment gost
			SAFETY COST=# 769/ma
	Ass	SUMING 173 HB/mo, ST	ANDRY HOURLY = # 444/4R
			Say \$495 /HR.
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1			
4	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	and the same and the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of t	1
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DATE: 3/10/87 TIME: 2:50 PM	TELEPHONE MEMORANDUM	PROJECT NO.  8608554P
(TO) (FROM) MR. BO.  COMPANY TVLIERE  RECORDED BY DAN	CONSTRUCTION CO.	ROUTING  DURO
PROJECT RM4.	N THE	FILE 21947 T2
Bob Care equipment m	lled back with estimate rodification. The follows	
i) Quet	monthey part \$21000 /m	suisment 17500 pay/
2) Encl	CAT 966	4240 @/mo.
	CAT 235 CAT Db CAT 08	4410° /mo.
4) Bus	Conditioner - Standard thing Device Brackets re time effend \$50000/	
5) Cons	edigible operating cost	Premium
non	to use involved. Co higher than expects the quaranteed central	the price will
iso	t considered short terride incential	
7	•	

#### RECORD OF VERBAL QUOTE

	Rocky Mtn Arsen	val	
	ion: Tenser		
Quote #:	(Estimate Sht. No.	)	
Firm: Name:	Henry's Safety +	Supply	
	: <u>Golden</u> , CO e No.: (303) 279-8	· · · · · · · · · · · · · · · · · · ·	
	alked To: Ron	ZA 11	
Type of Quote:_	Supplier, material on	aly (FOB Point: )	
		al installed (Cost to Prime)	
Scope/Descripti	on/Amount of Quote:		
5 minus	the escupe packer nask, 5 min. bottle belt, pigtail	#612	-دخيني
Airline		\$ 164.30 for 1009 \$105 for 50	>F#
Pigtui Pigtui		\$13. Wench	
Toran Aircines Tis		\$14.50 emh	
Regul	- linuary	\$145 WO LITER \$105	
Alarn		\$93 each	
Micraf			
	ud mouth (throut mec)	\$ 198	
**************************************	out mic w/radio transiter and head set (Eurmark)	\$1340	
Surv	vair 60 min SCBA (34 16)	\$1795 list price	
	30min SCBA (d186)		
Date Quote Reces	.ved:		
Quote Received 1	By:	<del></del>	

#### RECORD OF VERBAL QUOTE

Project: Name: Rocky Mtn. Assend  Location: Denver
Quote #: 2 m/SC. (Estimate Sht. No)
Firm: Name: Air Products
Location: Denver
Telephone No.: (303) 329-9353
Person Talked To: Dan Literas
Type of Quote: X Supplier, material only (FOB Point: RMA)  Subcontractor, material installed (Cost to Prime)
Scope/Description/Amount of Quote:
They truck in all their air form Kansas. Not certified to pump air in Denver from their facility
\$ 15/cylinder
no delivery or pick-up charge #3.95 charge per cylinder if keep past the end of the month

Date Quote Received:	317/87
Quote Received By:	Kisa Lerhart

### RECORD OF VERBAL QUOTE

RECORD OF VERBAL QUOIE
Project: Name: RMA  Location: Denour, CO
Quote #: 3 m/6C. (Estimate Sht. No)
Firm: Name: Air Products
Location: Denver
Telephone No.: (303) 329-9353
Person Talked To: Dan
Type of Quote: X Supplier, material only (FOB Point:)  Subcontractor, material installed (Cost to Prime)
New quote:  If they are looking at 30-40 any linders a day they will get certified to pump air in Derwer They will charge \$8.50 cylinder for every \$3.00 per cylinder for every cylinder Kept past the end of the month.

Date Quote Received:	3/20/87
Quote Received By:	Disa Herriart

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